

A BUSINESS GUIDE

**Environmental Performance
and
Competitive Advantage**

A BUSINESS GUIDE **Environmental Performance and Competitive Advantage**

May 1998

Prepared for:
Ministry of the Environment

by:
The Delphi Group

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The Ministry of the Environment has a number of programs in place that work to assist business become more competitive and address environmental issues in a cost-effective manner. The Industry Conservation Branch can further advise you on the programs and workshops available to assist you. Please contact:

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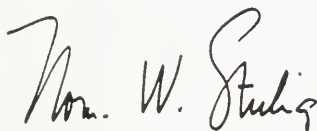
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Preface

Competitive Ontario businesses are critical to our future economic sustainability. At the same time, all the people of Ontario have the unquestionable right to a healthy environment. Today, there is a growing understanding that these are compatible goals; no one has to trade one for the other.

More and more, Ontario companies recognize that good environmental performance is good business. This guidebook *Environmental Performance and Competitive Advantage: A Business Guide*, is an aid. It demonstrates how addressing environmental issues in a systematic way can provide new opportunities to focus on core business objectives such as improved productivity, increased market share, enhanced corporate image, higher share value and reduced cost of environmental compliance.

I hope this guide will be useful to you and your company. This is one method by which the Ministry of the Environment is supporting future business competitiveness through innovative approaches. By sharing our know-how and expertise, we can solve old problems in new ways. We believe industry, business and individuals must be given flexibility and options as we work towards solutions to the challenge of achieving a dynamic economy set in a healthy, safe environment.

A handwritten signature in black ink, reading "Norm. W. Sterling". The signature is fluid and cursive, with the first name "Norm." and last name "Sterling" clearly legible.

The Honourable Norman W. Sterling
Minister of the Environment

About this Guide



Notes

To those who have an Environmental Management System in place:

Congratulations!

You have taken an important step in addressing environmental issues that your company faces. In initiating an Environmental Management System (EMS) you may have already developed some Environmental Performance Indicators (EPIs), as a means to indicate how the environmental objectives and targets are meeting the International Organization for Standardization (ISO) 14001 EMS Standard.

This guide, however, takes a different approach in selecting EPIs. It bases their selection on your company's core business objectives. As such, it will be easier for all levels of senior management to understand the relevance of EPIs to the company's business strategy. Although the approach is different, in a number of cases, the actual EPIs selected and developed will be the same as within the EMS framework.

Part B contains further details and a chart illustrating the relationship of EPIs to an Environmental Management System. For additional information on types of EPIs and their role in an EMS, readers may wish to obtain a copy of ISO 14031—Environmental Performance Evaluation.

The Focus of this Guide

This guide provides advice on why and how business should measure and report environmental performance. It focuses on the process of selecting indicators based on a company's core business objectives which may include

- Increased market share
- Improved productivity/net profit
- Reducing the cost of compliance
- Enhanced share value
- Positive corporate image.

Part A, Section I discusses how to add value to business objectives from implementing environmental initiatives. Integral to this process is the use of indicators to measure and report performance against your company's set objectives and targets.

This guide can provide benefits if you answer 'yes' to any of the following questions.

- ☐ Are you trying to track environmental performance?
- ☐ Are you trying to reduce your cost of compliance?
- ☐ Do you have an Environmental Management System, but need to benchmark performance? (see Notes)
- ☐ Do you have an upcoming plant expansion or wish to build a new plant that will require regulatory approvals?
- ☐ Does the local community have concerns about your operation's emissions or impact on the environment?
- ☐ Do you want to ensure that environmental liability is minimized?
- ☐ Do you want to ensure that your environmental profile does not negatively affect your corporate image?
- ☐ Do you want to demonstrate environmental responsibility to your customers?
- ☐ Are you looking for a marketing advantage?

Key Environmental Issues that Demand a Business Response

Key environmental issues and trends will affect Ontario companies and will drive the demand for business to respond. New solutions, improved performance, new and sustainable technologies, products and services will be the result.

Costs of Water and Energy

The cost of water is projected to increase as the demands of the aging infrastructure and costs of new infrastructure will force municipalities to move to full-cost, user-pay systems. In addition, many jurisdictions are anticipating potential increased energy costs.

Public Concern about Health

Poll data shows a growing concern in Ontario and around the world about the effects of pollution and chemicals on human health. Studies have shown that hospital admittances for respiratory problems increase during periods when there are elevated levels of ground level ozone, and inhaled particulates can be linked to increased death rates. (Ontario Smog Plan)



Notes

Sixty of the world's largest insurance companies have signed a statement urging governments to reduce carbon emissions, as they have seen weather-related insurance claims climb to \$66 billion in the first six years of the 1990s, from \$17 billion in the entire decade of the 1980s.



Tips for Success

Step 2 (page 12) lists more potential trends and issues that may affect your business.

Increasing Population

The Ontario population base is projected to grow by 35% in the next 25 years, putting more demand on agricultural land, water resources and energy. As a result increased air pollution (related to both industry and traffic), impairment to water quality and quantity, and scarcity of available landfills will occur if not addressed.

Climate Change

The global concern about the potential effects of CO₂ and other air emissions on the world's climate patterns will increasingly have an impact on business, especially high-energy consuming companies. Pressure to reduce emissions will come from various stakeholders and result in stronger international pressure and agreements, government legislation and voluntary agreements.

Resource Use

Increased economic growth and an improved standard of living around the world will create much greater demand for land, water, energy and raw materials. These factors will contribute to the continuing damage of the ecological health of the planet, as demonstrated in issues such as ozone depletion; climate change; the degradation of renewable resources; the accelerating rate of species loss; and the accumulation of emissions and wastes in the atmosphere, water systems and land.

The Benefits of Measuring and Reporting Environmental Performance

By measuring, reporting and communicating your company's environmental performance, you can address public concerns about your environmental performance; meet stakeholder demands for accountability; drive internal change in your company and develop a competitive advantage through environmental leadership. This guide will assist you to understand better how to achieve these benefits.

Address Public Concern

Public concern about the environment is here to stay and according to public opinion research, anxiety is increasing particularly in relation to health issues. Environics International studies suggest that a 'green wave' will again emerge. They predict that in the next few years we will see consumers demand that government and industry take further environmental measures. In addition, consumers will express their desire to spend dollars on environmentally credible products and services.

Meet Stakeholder Demand

Business is frequently called upon to be accountable for its environmental performance. Stakeholders (government, the public, consumers, insurance companies, financial institutions, corporate purchasers, and boards of directors) want more than warm and fuzzy green platitudes; they want to know exactly how a company is addressing environmental opportunities and concerns; and they want to know how it is performing — supported by specific performance data and trends.

“What gets measured and reported *really* gets done.”

— Woodruffe Associates Inc.

The local community is another important stakeholder group. While supportive of the important economic role that your business plays, community members also want to be assured that your company is not creating any health or environmental problems.

Drive Internal Change

It is a common business axiom, that “what gets measured gets done.” Woodruffe Associates Inc. has taken this one step further, stating that “what gets measured and reported *really* gets done.” By measuring, reporting and communicating EPIs a company will ensure tangible and measurable results from its environmental initiatives.

Create Competitive Advantage

Some companies are reluctant to be open with their performance. Yet, others are eager. After examining the environmental trends some companies have concluded that rather than ignore the environmental issues, they will be the first to find a competitive advantage from implementing and marketing environmentally superior products. Measuring and reporting their environmental performance through the use of Environmental Performance Indicators (EPIs) is one tool to drive internal change, and communicate their message.

What are Environmental Performance Indicators?

Environmental Performance Indicators (EPIs) measure and indicate some aspect of energy and/or environmental performance. An EPI is a very important tool for use in reporting a company's performance. For example, an EPI may provide information on

- How efficiently an organization or product uses energy, water, raw materials or other resources
- How quickly a company is reducing air or water emissions
- What types of waste are being reduced.

The types of EPIs used around the world are tremendously varied and depend on the type of business, goals of the organization, impacts on the environment and the concerns of various stakeholders.

**"It is not enough to be doing;
companies have to be seen
to be doing."**

— Christopher Henderson, *The Delphi Group*

How to Use this Guide

This guide is a resource book that outlines reasons for measuring performance; provides an overview of how to develop EPIs; and gives examples of what other companies have done across Canada and around the world.

PART A:

Illustrates how indicators may be used as an effective tool for integrating management and environmental performance into an organization.

Provides an outline of the steps to be taken to measure and report performance.

PART B:

Provides additional and useful resources for a company to develop EPIs including

- Examples of EPIs Used By Various Companies
- Relationship of EPIs to Environmental Management System Policies, Objectives and Targets
- Summary Of Best Practices
- Noranda Forest's Use Of EPIs
- Public Environmental Reporting Initiative Guidelines
- Further Resources.

To Small and Medium-Sized Enterprises (SMEs)

Regardless of the size of your company you need to understand how environmental issues affect your activities and address them through policies and procedures. While larger companies are more likely to have more resources available, smaller companies can often respond to a changing market place more quickly. Smaller companies may particularly want to focus on

- Taking advantage of new markets for products with environmental attributes
- Developing environmental products for niche markets
- Developing a positive public image and community relations
- Ensuring that they meet and exceed the environmental expectations of their large industrial customers.

Most of the issues in the guidebook apply as readily to a smaller company, as to a large multinational.

PART A

I. Add Value

through the Use of Performance Indicators

Overview

- Increased Market Share
- Improved Productivity/
Net Profit
- Reducing the Cost of
Compliance
- Enhanced Share Value
- Corporate Image and
Reputation

Environmental issues and concerns are here to stay, and stakeholders expect you to respond to them. This guide takes a new approach to selecting environmental performance indicators, by suggesting that your response to environmental concerns should be based on your company's own unique core business objectives.

The following section provides examples of different key business objectives (increased market share, improved productivity, reducing the cost of compliance, enhanced share value, and improved corporate image/reputation). Most companies will only focus on one or two of the objectives at any one time.

Table One (See page 2) gives an overview of the process (through examples) of identifying environmental indicators that can be used to meet your business objectives.

For every business objective there are potential risks and opportunities arising from environmental concerns. You may be able to identify areas in which you can create an opportunity from what others perceive as risks. You should then choose indicators that will drive the needed change through the company and communicate a credible message to stakeholders. The action plans and management tools will be used to support your environmental objectives, which support the business objectives.

This section demonstrates the positive opportunities that can result from addressing environmental issues in relation to core business objectives. Inevitably there will be some overlap between the various business objectives and means of integrating environmental performance.

Increased Market Share

A company with a large market share gains a stronger competitive position with greater potential returns on future investment. By responding to the environmental concerns and interests of customers, businesses can increase their market share. Here are several ways to increase your market share.

Promote Existing Attributes

Some companies already have a “green” product on the market, but may not be taking advantage of this asset. With an effective communication strategy, green attributes can contribute to developing the market share.

Develop Products

It may be worthwhile for a company to develop the “greenest” product on the market. Environmental business strategies are likely to be particularly effective when they provide specific benefits to the customer such as reduced energy and/or water costs, less packaging (less disposal costs) and/or health benefits. These indicators can demonstrate positive advantages to consumers.

- Energy use per day or year
- Water consumption per usage
- Percentage recycled content in packaging or product
- Volatile Organic Compound (VOC) gases emitted
- Organically grown content.

TABLE 1: Examples of Using Environmental Indicators to Meet Business Objectives

Business Objective	Potential Risks	Potential Opportunities	Environmental Indicators	Action Plans and Management Tools
Increased market share	Competitor's Greener Product Regulations setting higher standards Public concerns Green procurement policies Trade barriers to implementation Supplier qualifications	Develop greenest product Green procurement policies Greater market share	Energy usage of product Certification/ Verification (e.g., Ecologo, ETV) Awards/public recognition for leadership Water consumption per usage VOC gas emissions Organically grown content	Life Cycle Assessment Design for Environment Research and Development —new technologies/concepts Communications
Improved productivity/ net profit	Increased energy costs Increased cost of water Increased cost of solid waste disposal Product return legislation (e.g., Germany)	Improved efficiency Reduced liability Reduced costs Increased market	Water consumption Energy use Resource consumption Conversion efficiency Waste produced Air emissions produced Hazardous waste produced	Continuous Improvement Environmental Management System Pollution Prevention Benchmarking
Reducing the cost of compliance	Stiffer legislation and fines Increased costs Increased public scrutiny	Reduced costs Leadership role in shaping future legislation	Waste disposal Water emissions surcharges Toxic substance use Air emissions	Environmental Management System Pollution Prevention Dialogue with regulators Scenario planning
Enhanced share value	Demand by investors for environmental performance Failure to meet targets	Interest by investors in strong environmental performers	Energy consumption & savings Environmental Management System Water usage Material efficiency Ozone depleting substances Air emissions EMS in place Global warming impacts	Communicate environmental performance with financial community Environmental Management System Pollution Prevention
Improved corporate image/reputation	Negative publicity Slow approval from government Community opposition to plans	Positive publicity Quick approvals Influence upcoming and proposed legislation Increased sales	Compliance record Approval ratings Crisis response and management systems Voluntary agreements	Performance reports and dialogue with stakeholders Use of Environmental Reports Voluntary agreements Community Advisory Panels

Source: The Delphi Group



Notes

Products that could be considered "green" can be defined in a number of ways. For example, they may reduce the impact on the environment through

- Consuming less energy or water in their usage, thereby also saving money for the consumer
- Creating less waste problems through a longer life (e.g., low-mercury, reusable batteries, minimal packaging)
- Providing health benefits to consumers (e.g., furniture with low levels of off-gassing therefore contributing to better indoor air quality)
- Using a resource-efficient manufacturing process
- Utilizing recycled materials in the product and packaging.



Tips for Success

There are already a number of existing environmental labeling programmes (e.g., EcoLogo, Energy Star). Products with an eco-label are often given purchasing priority by organizations with green procurement policies (e.g., federal and provincial governments).

Resource Productivity

If a company can produce a product with less resources (e.g., energy, water, raw materials) costs may be reduced and the price of the product may be reduced, thereby creating opportunities for increased market share. The indicators used would be as described in 'Improved Productivity/Net Profit'.

Indicators can be the basis for making claims about the environmental performance of a product. They provide the credibility to consumers, indicated through labeling, information and consumer studies.

Case Study

Electrolux, based in Sweden, is the No.1 global producer of white goods products such as refrigerators, washing machines, stoves and vacuum cleaners. It is also an innovative environmental leader, intent on gaining market share and competitive advantage through the development of products that address environmental concerns. For example, using life cycle assessment it found that over 90% of environmental impact occurs while appliances are in operation. It has therefore created products such as

- A washing machine that uses only 40 litres of water (half of what standard products consume)
- A dishwasher with the market's lowest noise level and water consumption (15 litres). In addition many of its components are made from recycled plastics. It also consumes very little electricity. Using the BIO 50-programme, the consumption is 1.1 kWh per dish washing.
- An energy efficient stove with double ovens. The double oven concept provides the freedom to choose the most appropriate sized oven for the meal to be cooked. For instance, the small oven is useful for smaller dishes and cakes. It is quick and consumes half the energy compared to normal size ovens.

Appliances with low water and energy consumption demands are very well poised for a strong entry into rapidly growing markets such as China, Eastern Europe and Asia.

Case Study

Husky Injection Molding Systems in Bolton, Ontario, has taken a holistic approach to environmental management that they believe contributes to increasing sales and market share. Among the efforts made are

- Task forces to address energy conservation, reduction of volatile organic compounds in paints and solvents, spill response planning and training, waste minimization and recycling, management of hazardous wastes, and implementation of "green" purchasing guidelines
- A naturalized landscape that doesn't use pesticides and greatly reduces water consumption
- Waste minimization and recycling efforts resulting in an 85% waste diversion rate and generation of \$263,000 in income
- Energy efficient building design creating annual savings of \$525,000
- Environmentally conscious product design in which technologies promote reduction, reuse and recycling.

High levels of performance are often best achieved when there are tangible rewards such as recognition, awards, salary compensation or a bonus system.

Improved Productivity/Net Profit

By improving your environmental performance (i.e. through the efficient use of resources such as water, energy, and raw materials) you can improve your company's productivity. By reducing the price of production, you can increase your competitiveness and lay the foundation to generate a higher bottom line return. When you reduce the production of solid and hazardous waste materials, or find means for recycling or reusing them, you can also increase profit potential.

Measure activities for improved performance

EPIs provide an important tool in providing information and feedback to management to drive this process. It is a common business axiom, that "what gets measured gets done" while, "what gets measured and rewarded *really* gets done".

Reward achievements

High levels of performance are often best achieved when there are tangible rewards such as recognition, awards, salary compensation or a bonus system. The use of EPIs puts in place an objective system that allows you to reward employees and/or management personnel for reaching specific targets, e.g., achieving or surpassing waste reduction and water conservation goals.

Case Study

The Woodbridge Group (an autoparts manufacturer in Ontario) uses a scoreboard system to determine eligibility for a Gold, Silver or Bronze environmental award. An audit process measures environmental performance in a number of categories for each plant yearly. This competition has created a high level of motivation for every plant manager to continually improve their environmental performance.

Case Study

In 1995, the **3M Company** created a corporate environmental conservation policy and launched the Pollution Prevention Pays (3P) programme. The programme has saved the company well over \$750 million and consists of five parts

- Total management support
- A programme to reward creative employees who design pollution prevention projects
- A measurement system to find out how much was accomplished, and to report back to management the successes of the programme
- A method of passing on information so that once a pollution prevention project or technology was implemented in one facility, that information could be shared throughout 3M
- A method of reporting results so that all employees could understand the accomplishments achieved.

The results were conveyed in a number of ways. Idea sheets provided a one-page explanation of the problem, the solution (in broad and non-specific terms) and names of the individuals that designed the programme. This allowed an exchange of new solutions to problems, and gave recognition to the problem solvers. They also exchanged information at internal seminars and conferences on specific topics.

(Environmental Management in Canada)

Internal benchmarking can create a competitive desire to improve performance and raise standards, especially if a reward system is in place for high performance.

Benchmark Performance

EPIs can be used to benchmark internal performance. Within large corporations certain environmental cost saving and compliance solutions are not necessarily known throughout the different operating divisions. For example, one division may have begun to use returnable containers for holding parts, thereby saving packaging and landfilling costs while others may be unaware of the available approach and therefore not realized the cost savings. Internal benchmarking can facilitate and encourage the sharing of green practices. In addition, internal benchmarking can create a competitive desire to improve performance and raise standards, especially if a reward system is in place for high performance.

Drive Greater Productivity

EPIs are particularly useful for driving greater productivity and can be linked to financial indicators as shown in the following table.

EPIs and Related Financial Indicators

EPI	Financial indicator
water consumption (per unit production or total)	cost of water used (per unit or total)
energy use (per unit production, per square foot, facility)	cost of energy
amount of raw material used per unit production (conversion efficiency)	unit cost
waste produced (per unit production, total)	cost of disposing waste produced (per unit production, total)

Case Study

Schneiders, in Kitchener, Ontario, has utilized continuous improvement and team-based performance to drive energy and resource efficiency. For example, a comprehensive plan for water reduction reduced usage by 52%; reduction and recycling initiatives reduced solid waste by 68%; cleaning chemical usage has been reduced by 50%; and the use of foil paper in all processed meat items such as bacon or ham has been eliminated. The President has pointed out the value of focusing on resource utilization efficiency when he says "If we save 1 cent a pound, we make \$10 million profit."

Case Study

In 1992 **Westcoast Energy**, based in British Columbia, began at its gas processing plants to send spent non-hazardous silica alumina sands used as catalysts, together with spent desiccants, to cement manufacturing plants to be used as feedstock. The amounts were significant in that the average change-out at just the Fort Nelson plant generated about 33,600 kilograms of spent product suitable for cement manufacture. Used material that previously generated a disposal expense now generates income.

Annual Corporate Environmental Reports.

Reducing the Cost of Compliance

Reducing the cost of complying with legislation has direct financial benefits. The traditional means for addressing compliance is to use “end of pipe” technologies to reduce air and water pollutants emitted from a plant. By changing plant engineering processes to reduce or eliminate pollution before it gets to the pipe you can often have much better long-term financial savings. In addition, you can reduce risk (of spills, non-compliance); and improve relations with regulators and the community.

Demonstrating (through use of EPIs) that your company is in full compliance with regulations also has some clear business and financial benefits. When you can demonstrate full compliance you can prove to your insurance and financing sectors that the overall risk attached to your company is less. It may also help demonstrate due diligence if an environmental problem or accident occurs.

In addition, a long-standing demonstrable record of good corporate performance and compliance may make it easier for regulators to assess the company. A good record can greatly improve community relations, which may affect your company's ability to expand operations, or open a new site.

Using EPIs to Support and Achieve Compliance

Performance indicators can be useful tools to help drive the necessary behaviours for you to achieve and maintain compliance. At a basic level, you can motivate behaviour modification by making individuals specifically accountable for achieving a certain level of performance against chosen indicators.

Using EPIs to Reduce the Cost of Compliance

Typically, as a profit-oriented organization you want to minimize the amount spent on managing environmental compliance. Seldom considered a “value added” part of the core business, environmental performance indicators can support reductions in the cost of compliance and could include

- Cost of solid waste disposal per unit of production
- Cost of hazardous waste disposal per unit of production
- Tons of suspended solids per unit of production (applicable to pulp and paper industry where loss of suspended solids to wastewater represents loss of valuable fibre that could have otherwise gone into making product for sale)
- Cost of water emissions surcharges.

Reinforcing Credibility with Regulators

Past performance demonstrated by the strategic use of EPIs can reinforce your credibility and make obtaining permits from government departments less cumbersome. Credibility can expedite the approvals process for a plant expansion or new siting. On the other hand, poor performance or the lack of communication of good performance can result in loss of your “license to operate” — both formally (government) and informally (public).

Your company's voluntary use of non-regulated performance indicators — made available to government inspectors — may give inspectors more confidence that you are practicing good environmental stewardship. Experience shows that organizations with demonstrable environmental credibility may derive the following benefits

Past performance demonstrated by the strategic use of EPIs can reinforce your credibility and make obtaining permits from government departments less cumbersome.



Notes

A recent survey by **The Delphi Group** of several Ontario companies reported that being an environmental leader in the industry has led to good rapport with government and resulted in fewer disputes with the local municipality.

A number of funds have been changed or launched to include specific environmental criteria that evaluate a company's future risk due to threats from environmental issues such as global warming, acid rain, and ozone depletion.

- Receiving Certificates of Approval without *undue* delay
- Fewer inspections, which divert the time of staff away from their normal duties
- Faster approval of Environmental Assessments, possibly with more latitude to develop your own reasonable mitigative measures to address environmental concerns, as opposed to being forced to adopt measures proposed by regulators.
- Credibility with local residents may help to avoid complaints and concerns which would lead local residents to request more extensive public consultation procedures prior to the construction of a proposed facility (e.g., a ski hill, landfill, etc.), as could be required under the Ontario Environmental Assessment Act. As well, community acceptance may be necessary for the expansion of a facility and the attainment of the required Certificates of Approval (C of A). The C of A process requires a posting on an electronic bulletin board to collect public comments and concerns. A negative response from citizens will slow down the approval process, and may even result in the rejection of a C of A.

Enhanced Share Value

When investors are determining the value of a company, a number of factors contribute to their evaluation. The most important environmental factor is the element of risk. Some investment companies are broadening and changing the definition of risk. For example, the Royal Bank and the Canadian Imperial Bank of Commerce (CIBC) evaluate a company's environmental risk prior to investing or lending money. They consider an environmental management system a key indicator of reduced risk.

Increasingly, investment funds managers are looking at evaluating a company's environmental performance. Some research has found that strong environmental performance contributes to better financial performance (see for example *Does Improving A Firm's Environmental Management System and Environmental Performance Result in a Higher Stock Price?* by ICF Kaiser International Inc. and Storebrand Scudder's Environmental Value Fund prospectus).

A number of funds have been changed or launched to include specific environmental criteria that evaluate a company's future risk due to threats from environmental issues such as global warming, acid rain, and ozone depletion. One European fund even asks companies to quantify the costs and benefits they derive from environmental expenditures.

Examples of indicators of performance that some funds (e.g., Sustainable Asset Management, Green Money for a Blue Planet, Swiss Bank, Union Bank, Environmental Value Fund) are asking for include

- Environmental Policy
- Frequency of environmental auditing
- EMS in place
- Cost for energy
- Energy consumption and savings
- Use of and dependence on fossil fuels

“It is becoming increasingly clear that the banking industry’s main contribution to sustainable development will be to assess companies’ ecological quality as well as their financial creditworthiness. This applies equally to credit rating, investment banking and investment recommendations.”

— Swiss Bank Corporation

- Water consumption and savings
- Air emissions contributing to acidification
- Use of ozone depleting substances.

Case Study

The **Environmental Value Fund (EVF)**, was developed jointly by a major Norwegian insurance company (Uni Storebrand) and a US investment firm (Scudder Stevens and Clark). EVF manages \$70 million invested by six institutions: Norwegian-based conglomerate Orkla, Anova (Swiss) UNI Storebrand Life Insurance, Swiss Re, Gerling Konzern (Germany) and Trygg-Hansa (Swedish).

EVF developed a Sustainability Index with performance benchmarks for each industry. The Index uses environmental criteria based on work developed by the World Business Council for Sustainable Development (WBCSD) and includes factors such as: ozone depletion and global warming impacts, material efficiency, toxic releases, energy intensity, water use, environmental liabilities, and quality of the company’s environmental management system.

EVF applied the selected criteria to the world’s largest 500 companies, and found that the average rate of return in this group of companies over the past five years was 12%. In contrast, the top 200 companies in the group (according to the criteria) had a rate of return of 14% over the same period. Finally, the best 74 companies according to the criteria that EVF eventually invested in have had an annual rate of return of 22% over the past five years. Among the companies rated highly on the Sustainability Index are Michelin, Novartis, BT, Danish Steel Works, ING Group and MoDo.

Case Study

Nortel has made a substantial commitment to addressing environmental issues and being a leader in the field. This commitment has been rewarded by increasing interest from various investment funds. In the past year Nortel has had over ten inquiries from investment companies on their environmental performance. When considering investment, companies have sent detailed questionnaires covering issues such EMS implementation, environmental policies, frequency of auditing, costs of energy and water savings, energy consumption, and substances contributing to ozone depletion and acidification. Investment funds have included Sustainable Asset Management (Switzerland), Green Money for a Blue Planet, Swiss Bank, Union Bank, and Jupiter Asset Management.



Notes

In addition to expecting high quality standards, many corporate buyers are beginning to demand that their suppliers meet specific environmental standards. Procurement guidelines may set specific environmental criteria and standards that suppliers must meet (e.g., **Ford, GM, Chrysler**). A supplier's environmental performance may be evaluated through various questionnaires or environmental audits (e.g., **Quaker Oats**, the **Body Shop**, **Bell Canada**). Demonstrating strong environmental performance is becoming a necessary component for sales to some customers.



Tips for Success

In providing the public with information, emphasis must be placed on educating the audience. Often scientific information may not be fully understood.

Several large companies (e.g., **Noranda Forest**, **Westcoast Energy**) have found that working with a Community Advisory Panel (CAP) and maintaining good community relations can have an added bonus when a crisis or problem arises; the community will rise to the support of the company unasked. While it should not be the reason for starting a CAP, it can have a very positive result.

Improved Corporate Image and Reputation

The image a company projects through its presence and actions helps to sell its products and services to customers. Strong environmental performance, communicated through the use of EPIs can provide quantitative evidence that you are managing environmental issues responsibly. The simple act of measuring and reporting this information, both the good and bad results, will assist you in promoting your company as willing to be responsible and accountable for your actions and open to scrutiny. A positive environmental reputation improves customer relations, and addresses the concerns of the community, the general public and environmental groups.

Customer Satisfaction

Many companies focus on satisfying customers, using tools such as quality management programmes, information (1-800) lines, and high standards for employee training programmes. These can all incorporate environmental elements. EPIs can validate your customers' concerns about environmental performance claims with respect to your product, service or processes.

Community and Public Concerns

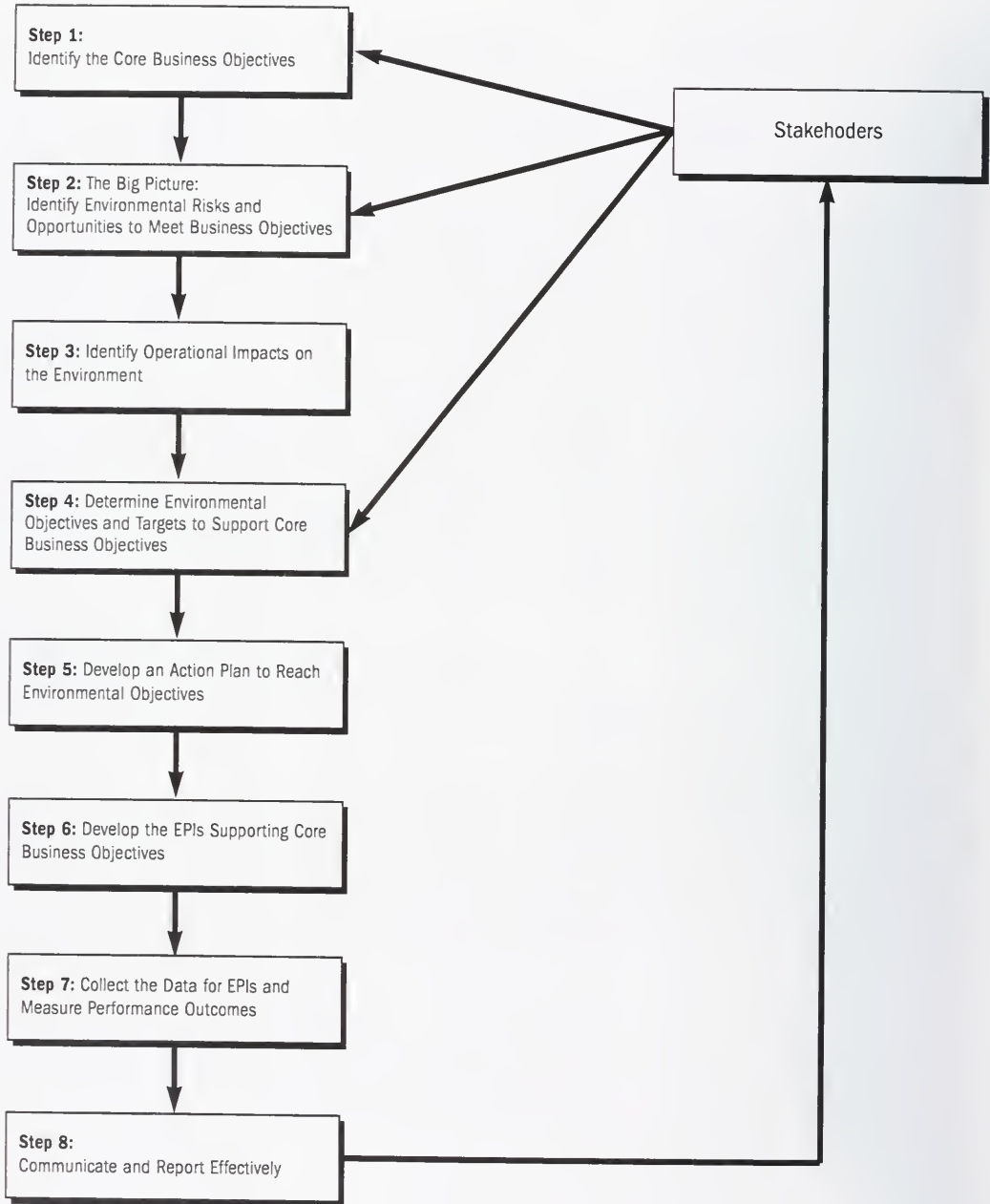
Essentially, the public wants to know the impact of your activities on their health and the immediate environment. To a lesser extent they want to know how your company's activities are affecting the environment in general. EPIs are an important tool for providing information on your activities which may harm the public's health (e.g., sulphur dioxide emissions), immediate environment (e.g., restoration of a nearby industrial site), and the general environment (e.g., green-house gas releases potentially leading to climate change).

You can demonstrate responsible corporate citizenship by taking part in different types of industry-government partnerships, signing voluntary agreements and or Memorandums of Understanding (MOUs). The results of these programmes can be communicated through community newsletters or Community Advisory Panels (CAPs).

Environmental Groups

Environmental groups range in scope from international (e.g., Greenpeace) to national (e.g., Pollution Probe) to local (e.g., Bay Area Restoration Council of Hamilton). They also differ in the types of issues that they address and in their opinion on the trustworthiness of information provided by companies. EPIs will provide them with better information on your company's environmental performance. If your company's performance is perceived as being communicated openly and honestly with significant issues being addressed, then the environmental groups may have limited concerns and take no action. However, if a company's performance is perceived as being communicated untruthfully or not at all, and significant issues are not addressed, then environmental groups may target the company for further action. In addition, some potential customers (e.g., World Bank, Canadian International Development Agency) listen to the advice provided by environmental groups.

FIGURE 1: Overview of Steps



II. Steps to Develop and Report Environmental Performance Indicators

Overview

- 1. Identify the Core Business Objectives
- 2. The Big Picture: Identify Environmental Risks and Opportunities to Meet Business Objectives
- 3. Identify Operational Impacts on the Environment
- 4. Determine Environmental Objectives and Targets to Support Core Business Objectives
- 5. Develop an Action Plan to Reach Environmental Objectives
- 6. Develop the EPIs Supporting Core Business Objectives
- 7. Collect the Data for EPIs and Measure Performance Outcomes
- 8. Communicate and Report Effectively

Figure 1 provides an overview of the following eight steps. Stakeholder input should be used to influence steps 1, 2 and 4.

Throughout the steps we have used a fictitious company, *Designer Kitchens* as an example of a small company going through this process. The examples are not comprehensive.

Step 1: Identify the Core Business Objectives

When your environmental initiatives are driven by your company's core business objectives the environment will receive the necessary financial and senior management attention—and your company will receive solid returns that will benefit key stakeholders.

Your current priority business objectives are those that are most important to your company and your stakeholders. They are usually established by the CEO, owner or Board of Directors and will be the driving force of the company for the next few years. These priorities may change.

Your Core Business Objectives will involve issues such as

- Market Share
- Net revenue/productivity
- Cost of compliance.
- Share value
- Corporate image/reputation

The Core Business Objectives will determine the environmental issues you choose to measure and report. See **Table 1** (page 2) for examples.

Note: Every company will focus on a different combination of core objectives depending on its industry sector, position in the market and demands of various stakeholders. For example, a steel producing company may focus primarily on improving net profit and reducing the cost of compliance, while a telecommunications company may be most concerned with increasing market share. To identify the issues of interest to various parties use tools such as surveys, informal information gathering, grievances from trade unions, shareholder meetings, regulatory reports, and community advisory committees.

Table 1 illustrates some common Core Business Objectives and identifies some of the potential threats and opportunities that you may face in Step 3.

Case Study: Designer Kitchens

Core Business Objectives

Designer Kitchens is an aggressive company which is targeting the US, Japanese and European market with high-end wood products for the home such as cabinets, doors, and vanities. The company currently employs 50 staff, but the General Manager is confident that the company will increase sales within two years from \$5 million to \$8 million. The three core business objectives of Designer Kitchens are

- to increase domestic and foreign sales, and enhance market share
- to realize higher net profit
- to enhance corporate image relating to product quality.

Step 2: The Big Picture: Identify Environmental Risks and Opportunities to Meet Business Objectives

For your business to thrive you need to be aware of the many changes that continually occur in your own marketplace.

An emerging issue or changing marketplace can present both a risk and an opportunity. Strategic thinking and planning can turn a risk into an opportunity. By monitoring environmental trends you will be better prepared to mitigate any risks, and create opportunities before your competitors. Potential risks and opportunities include:

By demonstrating leadership through signing agreements, you will have greater flexibility in achieving desired environmental performance levels and may avoid tougher regulations in the future.

- **Increased water rates:** A trend across Canada is to move to full cost pricing for water and a user-pay system. As this occurs, water rates may rise in many jurisdictions. Consider planning capital investments in more water efficient processes, and developing products that consume minimal amounts of water.
- **Legislation:** New legislation (e.g., strengthened pollution controls) can dramatically change your company's operations and profitability. By staying abreast of legislative trends you can anticipate potential risks and reduce their impact. By being proactive and working closely through an industry association you may be able to influence the direction of new legislation.
- **Voluntary agreements:** A trend across Canada is to develop voluntary agreements, Memorandums of Understanding (MOUs) and various partnerships between government and industry sectors and individual companies that will lead to improvements in environmental performance. By demonstrating leadership through signing agreements, you will have greater flexibility in achieving desired environmental performance levels and may avoid tougher regulations in the future.
- **Public opinion trends:** Trends may indicate where future public pressure will demand new or revised legislation. For example, there is a growing concern surrounding health issues. This may lead to opportunities for products that provide solutions (e.g., indoor air filters). The public may expect greater industry and legislative response to smog concerns. For example, strong public support in Ontario for greater controls on car emissions helped persuade the government to implement an inspection and monitoring programme on car emissions.
- **Industry sector reputation:** The poor reputation of an industry sector can negatively affect even the most environmentally responsible company. Programmes such as 'Responsible Care'® by the Canadian Chemical Producers' Association help boost the sector's reputation. Take advantage of an opportunity to work within your industry sector to develop environmental guidelines and EPIs that all companies can use.
- **Global competition:** Know what the competition is doing in your markets and potential markets. Companies in other countries may be driven by tougher legislation or stronger consumer drivers which lead to more environmentally friendly or more efficient products or services. These products may win future markets as consumer/industrial demand or legislation changes.
- **Niche market opportunities:** As the market changes, opportunities develop for new products and services that address environmental concerns. For example, the market for water filters has grown dramatically in the last five years. The water filter industry has become a \$2-billion industry in response to consumer concerns about water quality.



Notes

Issues and trends continually change. Magazines, trade journals, industry associations, conferences and seminars can help you stay on top of the issues, and provide insights into strategic responses.



Tips for Success

Your stakeholders (e.g., employees, community members, environmental groups, shareholders) play an important role in helping identify your environmental issues. When the concerns of stakeholders vary significantly you must decide which concerns are most important to your strategy.

- **New technologies:** You may develop new technologies to address environmental issues that may result in a new marketable service or product. A better and more environmentally friendly process may give your company a competitive advantage in winning a contract or opening a branch plant in other jurisdictions.
- **Community issues:** Stay in touch with the local community and be aware of their concerns. For example, if the quality of the source of drinking water is a growing concern, local companies may be targeted for action even if it is unclear there is a direct link to the contamination. By being proactive and actively involved in the community, problems can be avoided.
- **International agreements:** Ratified agreements and treaties will eventually trickle down to have an impact on national and provincial regulations. For example, the Montreal Protocol on ozone depletion resulted in federal and provincial regulations that limit the use of CFCs and other ozone depleting substances. Climate change agreements could have a very large impact on some industries, especially those that are energy intensive.

Case Study: Designer Kitchens

Examples of Possible Impacts from Trends and Issues

Legislation

More stringent legislation with respect to air emissions, solid and hazardous waste could result in additional costs and violations that could result in expensive convictions if the company is not applying due diligence. On the other hand, by proactively implementing pollution prevention measures (e.g., improving housekeeping, investing in high-volume low-pressure (HVLP) spray guns, etc.) they may see a significant reduction of VOCs and beneficial financial payback.

Global Competition

Although Designer Kitchens is already established in the global market, the competition in Europe and Japan are complying with more stringent regulations making their environmental performance better. Potentially Designer Kitchens could lose market share if public perception and international agreements change, creating higher environmental performance expectations.

New technologies

HVLP spray applicators substantially reduce over-spray resulting in reduced hazardous waste disposal costs, and reduced raw material use and associated purchasing costs.

Water-based and high-solids coatings and glues with lower concentrations of solvents release smaller quantities of VOCs per unit applied. This reduces air emissions; creates fewer indoor air quality problems for workers; and can be used as a marketing tool to sell products to consumers concerned about health.



Notes

If you have an Environmental Management System (EMS) in place you will have already gone through a very similar process in identifying the "aspects" and "impacts" of your business on the environment. This can also be called an "effects analysis". The ISO EMS Standard places significant emphasis on performing this activity before all others, e.g., generation of policy, objectives and targets as the output is required to ensure that all significant aspects have been addressed. (See how EPLs fit in with an EMS on page 37.)

Step 3: Identify Operational Impacts on the Environment

Analyzing the impact your company has on the environment is critical. This step can be done in parallel with Step 3.

Examine and list the ways your organization affects the environment, through various processes, products or services. Examples of environmental issues that may relate to your business include:

Environmental Issues	Environmental Impact
Stack emissions	Smog, air pollution
Sewer discharges	Water contamination
Packaging	Landfill loading
Refrigeration maintenance	Ozone depletion
Fossil fuel combustion	Climate change
Storage tank leaks	Soil and groundwater contamination
Hazardous wastes	Soil and groundwater contamination

Once you have identified how the environment is affected by your company's operations, you need to analyze how the potential impacts could affect your core business objectives. For example, if your company's reputation is a core business objective and you are in a community that is greatly concerned about air quality and smog issues, then you will want to address and prioritize any problems that your company has with stack emissions.

Designer Kitchens provides a few examples of the potential impact of environmental issues on core business objectives.

Case Study: Designer Kitchens

Environmental Issues	Potential Impact on Core Business Objective
Generation, Handling and Disposal of Hazardous Waste • Large quantities of wasted raw materials (primarily paints, lacquers, etc.) generally stored outside in open drums and disposed of as a waste sludge or off-spec virgin raw material • Contaminated water and sludge from the water-wall spray booth • Used solvents, small amounts of oils and grease.	Contamination of local surface or ground water and soils if a spill occurs (drums stored outside with no covers or surrounding containment) could lead to • the violation of regulatory statutes • liability issue if someone is harmed • significant clean-up costs • bad press reviews resulting in local public outcry • a negative impact on the company's image which may reduce sales or share value. Improper storage, handling, training, could result in • the violation of regulatory statutes (Reg. 347 or Occupational Health and Safety)

Continues on next page...

Case Study: Designer Kitchens (continued)**Environmental Issues****Potential Impact on Core Business Objective****Indoor Air Emissions**

- Volatile Organic Compounds (VOCs) from solvents, glue and lacquers
- Particulates, aerosols and dust from operations (e.g., cutting and planing wood, paint overspray).

Emission of VOCs, particulates and aerosols reduce indoor air quality which could lead to

- lower productivity, employee absenteeism, and worker health & safety issues (e.g., regulatory, liability, deteriorating union/management relations)
- high internal concentrations of VOCs or other compounds could cause an explosion resulting in large costs (e.g., repair and lawsuits)
- injury and down-time
- increased costs may lower competitive advantage and decrease sales.



Notes

It is important to engage the different stakeholders in this process of setting environmental objectives.



Tips for Success

Set and publicize targets that you will be able to meet and perhaps exceed. Your stakeholders will appreciate your success. You will need to openly explain the reasons if you fail to meet your targets. Many companies (e.g., Shell Canada Ltd.) have reported changes to specific targets in their public environmental performance reports without receiving excessive criticism. It is usually better to exceed performance targets than fall below them, unless there is a clear reason for the lapse. Your announced targets must be clearly understandable and meaningful to stakeholders.

Step 4: Determine Environmental Objectives and Targets to Support Core Business Objectives

By understanding potential environmental risks and opportunities and your company's environmental impact, you are now ready to establish your primary environmental objectives.

Establish specific environmental objectives that are congruent with core business objectives. Make sure the environmental objectives realistically account for the time, money and effort that will be required to attain them.

Targets

The targets are more detailed performance requirements that arise from the environmental objectives. Choose them based on careful consideration of the balance between what is technologically and financially feasible to achieve, while also pushing your employees to be creative and reach high targets. Clearly outlined incentives such as awards, recognition and bonuses can help companies reach higher targets.

Case Study: Designer Kitchens

The following table contains an example of one core business objective, and the related environmental objectives and targets that Designer Kitchens chose to focus on in its first year of an environmental programme.

Core Business Objective	Environmental Objective	Target
Increase domestic and foreign sales and enhance market share	Minimize the generation and toxicity of hazardous waste	50% reduction in the total annual quantity of hazardous waste produced by 2002, from 1997 baseline
Action		
Reduce the price of the product by lowering operational costs associated with the on-site and off-site management of waste.	Minimize raw material loss	50% total reduction in wasted off-spec paints by year 2000 from 1997 baseline
	Minimize the generation of solid non-hazardous waste.	50% reduction in the total quantity of solid waste going to landfill by 2000 from 1997.



Notes

ISO 14001

ISO 14000 is a wide range of international standards developed by the International Standards Organization to help companies manage, measure, improve and communicate the status of their environmental performance.

ISO 14001 is the auditable standard for environmental management systems which is the most central and widely applicable of the standards within the ISO 14000 series of standards. It defines an environmental management system as:

the part of the overall management system that includes organizational structure, planning, activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

— Canadian Standards Association

Step 5: Develop an Action Plan to Reach Environmental Objectives

To achieve your objectives develop an action plan and select a champion to keep it on course. The following programmes and management tools are available to assist you to achieve your environmental objectives.

Environmental Management System (EMS)

An EMS can provide a systematic way to ensure environmental issues are managed consistently and systematically throughout the company. While not essential, an EMS can be a very useful tool to assist an organization comprehensively address environmental issues and obtain greater credibility with government and customers.

An EMS sets out environmental policies, objectives and targets for a company while the indicators provide measurable goals, and a means for determining if the performance level has been reached. Often these will be the same EPIs that you chose for strategic business reasons.

While an EMS is an important tool for companies to manage environmental issues, it also sends a positive signal to its customers, indicating that it is taking environmental issues seriously. Certification through ISO 14001 may add further credibility to a company's perceived environmental performance, providing customers with an important indicator of your environmental commitment.

Note: The steps and a diagram illustrating the incorporation of EPIs within an EMS are described more fully in Part B.

Life Cycle Assessment

Life Cycle Assessment (LCA) attempts to determine the environmental impact (for example, solid wastes, hazardous wastes, air emissions, water effluents, energy consumption, water consumption, and ozone depletion) of a product or service through all its life-cycle stages: extracting and processing raw materials, manufacturing, transportation and distribution, use/reuse, recycling and waste management. The results of the LCA create powerful measures of environmental performance, indicating where you can take measures to reduce environmental impacts and strategize competitive advantage.

Case Study

Electrolux, based in Sweden, found through LCA that the greatest environmental impact of a kitchen stove was the energy consumption in daily use. This led to product development to reduce energy consumption through electronic controls that reduce energy use, and a sub-dividable oven compartment that saves energy. Electrolux also determined that teaching the customer how to save energy was important and has incorporated consumer education into its policies.



Notes

Most environmental labeling programmes analyze a product's environmental impacts throughout its life cycle to determine if a product meets specific environmental criteria.

Design for Environment

Design for Environment (DFE) is the systematic consideration during the design process of issues associated with environmental safety and health over the product life cycle. It takes many product development aspects into account: material selection, energy use, extended component life cycle, disassembly, reuse, recycling, and packaging with a focus on reducing the environmental impact. Design for environment, or sustainable design can result in products that are innovative, sustainable and that create new markets.

Case Study

Xerox, Mississauga, Ontario has employed DFE practices to dramatically reduce the amount of material entering the waste stream. An arrangement with Canada Post makes it easy for customers to return spent parts and consumables such as cartridges for reuse and recycling. Equipment is disassembled at the end of each life cycle and the maximum number of components are restored to original equipment specifications and reused in an ISO 9002 certified manufacturing process. Currently Xerox is recycling at a 94% rate at their Mississauga plant.

“Pollution prevention can be defined as “the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment.”

(Pollution Prevention: A Federal Strategy for Action — June 1995)

Pollution Prevention Programmes

Pollution prevention can be an effective management tool for reducing the cost of compliance; lowering future liability risks and costs; and lowering production costs by increasing the efficient use of resources.

Approaches to pollution prevention include

- Product reformulation
- Substitution for fossil fuels
- Energy efficiency
- Water recirculation
- Elimination of ozone depleting substances
- Process re-engineering that reduces resource use
- Redesign of product
- Reusable packaging.

Early strategies provided a platform for the next wave of improvements; some options became feasible only after earlier improvements were made.

Dow Chemical launched their Waste Reduction Always Pays (WRAP) programme in the early 1980s. It has resulted in \$1 million annual savings from 27 energy efficiency projects. WRAP challenged employees to propose waste reduction initiatives offering greater than 100% per year return on investment (ROI). The first year, 1982, brought 24 projects that met the standard, with a very satisfying average ROI of 178%. "Great, we've got the low hanging fruit," the managers thought. "But just in case we missed a few things, let's try it another year or two, to see if there's any more benefit." There was, year after year. In 1993 the company adopted 140 employee WRAP recommendations, with an average ROI of 298%! The cumulative record for the programme over more than ten years—204% ROI, and cumulative savings of \$110 million.

"How was this possible? One reason was that early strategies provided a platform for the next wave of improvements; some options became feasible only after earlier improvements were made. As the work force got smarter; people learned what to look for, spotted opportunities they would have missed without the experience and successes of earlier years. Both employees and managers were increasingly motivated by the profitable payoff from the projects—and the rewards provided to the people who suggested them."

New Bottom Line Web Site

Participate in Industry Association Environmental Committees to share knowledge and lobby regulators.

Further Management Tools

Other tools for managing environmental issues include

- Benchmarking performance with other companies (See page 39 for further information)
- Communicating with regulators about upcoming and proposed legislation
- Using scenario planning to understand what you might possibly face and develop possible options
- Forming Community Advisory Panels to understand concerns and involve the community in developing environmental objectives and targets
- Participating in Industry Association Environmental Committees to share knowledge and lobby regulators
- Delivering training programmes for employees on environmental issues
- Preparing newsletters for employees and communities
- Preparing a Corporate Environmental Report
- Signing onto Voluntary Commitments (e.g., Accelerated Reduction and Elimination of Toxics (ARET) and the Climate Change Voluntary Challenge and Registry programme (VCR)).

Case Study: Designer Kitchens

To achieve the goals and targets set out, Designer Kitchens decided to implement a pollution prevention programme focused initially on the “low hanging fruit.” They hired a consultant to advise them on available alternative technologies, and processes that would reduce solid and hazardous waste and VOC emissions. The Pollution Prevention plan was based on the 3Rs: Reduce, Reuse, Recycle.

Simple techniques that resulted in significant savings included

- Capturing and reusing wash solvents a second or third time to clean-out hoses resulted in a reduction of solvent purchasing and disposal charges of more than \$500 per month
- Donating 5,000 litres of off-spec paint to a local charity organization saved the company over \$1,000 in disposal fees. Improved inventory management procedures were subsequently implemented which all but eliminated the problem of purchasing more than was needed.

Additional and more complicated programmes and technologies were subsequently implemented. To ensure successful implementation of the Pollution Prevention programme Designer Kitchens developed and implemented a training programme for all employees focused on

- Purpose and objectives of pollution prevention
- Benefits to the employees, the company and the community
- Organizational policies and corporate goals and targets
- Awareness and specific skills required to implement new operational procedures (e.g., improved housekeeping and inventory management) and technologies (e.g., HVLP spray guns, solvent recovery unit)
- A reward system to provide incentives for reducing pollution.

As a result of the training programme, morale increased, the amount of solid and hazardous waste produced decreased, cost-savings were realized and a “pollution prevention” culture began to take hold at Designer Kitchens.

When first developing indicators it is important to “Keep it Simple.”

Step 6: Develop the EPIs Supporting Core Business Objectives

The EPIs you develop will be directly related to your environmental objectives and targets. They will measure your progress, and feed back the results to internal and external stakeholders.

In addition to choosing environmental performance indicators, try to find parallel financial indicators, where appropriate, to illustrate very clearly to stakeholders (e.g., senior management, boards of directors) how the environmental programme is adding value. The financial indicators may already be available through your accounting system, or may involve collecting the information in a new form.

Indicators should inform management and key stakeholders of your environmental performance progress as you move towards your targets. When first developing indicators it is important to “Keep it Simple.”

Getting Started

- Start with a small set of indicators.
- Involve those who will be reporting the data and information in developing the indicators.
- Before selecting EPIs, take an inventory of existing data and indicators to assess what is available in terms of quantity and quality.
- Determine if additional data is needed by comparing current data against your set objectives and targets.
- Determine the type of indicators to be used — absolute, relative or index.

Types of Indicators

Quantitative EPIs can be classified into three types: absolute, relative (or normative), and index. The complexity in the calculation of these types ranges from absolute EPIs — the simplest to indices — the most complex.

- **Absolute EPIs** report the basic data with little or no manipulation (e.g., total energy consumed/year).
Advantage: the magnitude of a problem can be assessed.
Disadvantage: the relative efficiency of a company or process cannot be assessed or compared.
- **Relative EPIs** are normalized to some aspect of production outputs, inputs, or a previous year (e.g., total energy consumed/barrel of oil produced/year).
Advantage: efficiency or inefficiency or change can be assessed.
Disadvantage: magnitude of a problem can be hidden.

A company which produces one or two products or uses one or two primary inputs will be able to develop a relative EPI more easily than a company that produces a large number of products or uses a large number of inputs.

Currently, the trend is to create a small set of key indicators made up of absolute and relative EPIs that address stakeholder issues. By using a combination of an absolute and a relative EPI, you can measure and report both the magnitude and the relative efficiency of a particular issue, e.g., total waste produced/year and total waste produced/barrel of oil produced/year.

- **An Index** is the combination of two or more EPIs using factoring and equations to produce a single number (e.g., Nortel's Environmental Performance Index which summarizes all of their environmental performance criteria into a single abstract number compared to a benchmark unit of 100).

Advantage: it simplifies an issue and can communicate an overall assessment of environmental performance for an entity such as a company.

Disadvantage: Needs extensive resources and time to develop and has limited use as a decision-making tool as both good and poor performance can be masked within the single index number.

Many companies consider the index to be of limited value for these reasons.

See Part B for details on the types of indicators that can be developed, and those that are currently used by companies across Canada.

Case Study: Designer Kitchens

The following table illustrates the EPIs Designer Kitchens selected, based on the environmental objectives and targets. In addition, they selected indicators that linked environmental performance directly back to their core business objective of increased sales (reduced product price from lower operational costs).

Environmental Objective	Target	EPI	Indicator Related to CBO
Minimize the generation and toxicity of hazardous waste.	50% reduction in the total annual quantity of hazardous waste produced by 2002, from 1997 baseline.	Quantity of hazardous waste generated per \$10,000 sold.	Cost of hazardous waste management (i.e. storage, handling, purchase ¹ + disposal) per \$10,000 of product sold.
Minimize raw material loss.	50% reduction in wasted off-spec paint by the year 2000.	Quantity of wasted off-spec paint per 1000 products produced.	Cost of purchase + disposal per 1000 products produced.

1 This cost should also include the purchasing costs. Wasting less means reduced disposal costs and reduced supply/material costs.



Tips for Success

Whatever methodology you chose; document it; and document it well. You can then evaluate your EPIs for auditing purposes.



Notes

Indicators, methodologies, calculations and systems can always be changed if they don't work.

Step 7: Collect the Data for EPIs and Measure Performance Outcomes

Once you decide which indicators to use, determine how to collect the needed information. This is usually a logical extension of the specific EPI.

Some or all of the data may already be available through various systems (e.g., costing systems, regulatory reporting). Compilation may simply require some modifying or consolidating of data.

Methods of collecting data may include

- Deriving information from accounting records
- Using process efficiency information
- Continuous monitoring (e.g., water metering)
- Real time empirical (e.g., monitoring water effluents for BOD (Biochemical Oxygen Demand), temperature)
- Random and structured sampling (e.g., for air emissions)
- Independent measurement and observation
- Independent auditing
- Measurement by proxy
- Surveys (e.g., random or sample survey of customer perception of company performance)
- Arithmetic calculations.

Getting Started

- Develop methodology and train personnel in its application.
- Establish chain of responsibility.
- Involve the data collection and compilation personnel in the design of EPIs and related systems.
- Determine the unit of measure to be used and keep it consistent.
- Develop a data base management system.
- Evaluate the data collection systems on a regular basis.

Use the indicators to measure performance on different issues. Evaluate your progress in achieving, exceeding or failing to meet your environmental objectives and targets.

Evaluate the results and measure outcomes to determine usefulness to key stakeholders.

The EPIs and the systems chosen are unlikely to be perfect at first. Through use, however, you will be able to identify which EPIs and related systems need to be improved.

**Tips for Success**

When reporting back to the stakeholders illustrate how the EPIs correlate with various financial performance indicators. This will demonstrate how you are reducing the company's financial risks by addressing environmental issues.

EPI	Indicator Related to CBO	Collection Methods
Quantity of hazardous waste generated per \$10,000 sold.	Cost of hazardous waste management (i.e. storage, handling, purchase + disposal per \$10,000 of product sold.	Purchasing/Accounting records. Production numbers (quantities used, spilled). Inventory records. Independent counting. Records from waste collector.
Quantity of wasted off-spec paint per 1000 products produced.	Cost of purchase + disposal per 1000 products produced.	Purchasing/Accounting records. Production numbers (quantities used, spilled). Inventory records. Independent counting. Records from waste collector.



Notes

Key stakeholders will vary from company to company.

Step 8: Communicate and Report Effectively

The communication plan is an extremely important component of your planning. By communicating the results and your specific message you will contribute to your business objectives.

The communication strategy can be used, for example, to

- Address existing or predicted concerns of significant stakeholders
- Gain the support of stakeholders to ensure that the investment in a proposed environmental initiative will win approval
- Change the minds of some stakeholders (e.g., convince board of directors that a new programme is beneficial; persuade customers of the product's environmental value)
- Demonstrate a competitive advantage of your product/services to consumers.

The concerns of the specific stakeholder groups, both internal or external, will determine the extent of the message, and the method of delivery.

Communication with stakeholders should be a two-way street. Your choice of indicators is very much influenced by the concerns and interests of your stakeholders, and their feedback on the information you provide.

Table 2 (See next page) lists potential audiences, their prime concerns and the type of indicators that would be of interest to them. Your company will want to communicate a specific message to address their concerns, backed up by supportive indicators. We suggest methods to deliver the message.

Case Study: Designer Kitchens

The following table illustrates an example of the environmental message (based on the performance results demonstrated by its EPIs) that Designer Kitchens could send out to various stakeholders in order to create a desired outcome.

Environmental Message demonstrated with EPIs	Stakeholder	Outcome
We have reduced our hazardous waste by one-half. This improves our environmental profile and also reduces our liability exposure.	Shareholders and prospective shareholders	Reduced costs, improved profitability. Company viewed as having less risk.
	Local Community	Improved corporate reputation may ensure local support for future plant expansions.
	Customers.	Improved corporate image may increase customer loyalty and result in new market share with concerned buyers.

TABLE 2: Using EPIs to Address External Stakeholder issues

Stakeholder	Concerns	Environmental Message	Indicators of Principal Interest	Possible Reporting Methods
Employees	Job security Safety Pride in organization Pay/benefits	Environmental vision and goals Environmental achievements Benefits to themselves and family Improved health Cleaner operations Cost savings—bonuses	Resource/energy efficiency Health and safety Environmental management Waste reduction Office environment Compliance Indoor air quality Sick days	Corporate environmental report Posters Employee newsletter Video from CEO Awards Bonus system Intranet
Board of Directors	Potential liability Corporate image Profit Strategic position Competitive advantage	Risk management Compliance Responsible environmental management Market opportunities Due diligence	Health and safety Environmental management Waste reduction Liability Office environment Compliance Resource/energy efficiency	Presentations Corporate environmental report Annual report Intranet
Shareholders/Owners	Financial performance/profitability, liabilities, market share, Environmental performance (for ethical investors)	Risk management Financial benefits Market opportunities Responsible environmental management Due diligence	Liability Compliance Environmental management Audits	Corporate environmental report Annual report Meetings Background briefings for analysts Media briefings Intranet/Internet
Media	Waste reduction Pollution prevention (See Environmental groups and financial community)	Pollution reduction stories Success stories (e.g., new technologies, products, solutions)	Waste reduction Pollution/Prevention Water quality Air emissions Resource Usage	Press releases/briefings Plant tours/open houses Advertising Corporate environmental report Internet
Environmental Groups	Materials/resource usage Waste management Ecosystem viability Global warming Ozone depletion Land use	Goals—Continuous improvement on environmental issues Working together Performance improvement Due diligence Benefits to environment	Waste management Pollution prevention Water quality Air emissions Emergency response Ozone depletion Global warming Life Cycle Management	Corporate environmental report Annual report One-on-one dialogue Plant tours Speakers Visitor centre Press releases Focus groups Community Advisory Panels Intranet

TABLE 2: Using EPIs to Address External Stakeholder Issues (continued)

Stakeholder	Concerns	Environmental Message	Indicators of Principal Interest	Possible Reporting Methods
Financial Community	Financial performance Liabilities Potential risk	Risk management Responsible environmental management Due diligence Financial benefits	Environmental management Compliance Emergency response	Corporate environmental report Annual report Quarterly newsletter Interviews in financial media Surveys Internet
Customers and Suppliers	Product quality Product cost Product safety Product liability Environment/health performance Toxic chemical usage	Committed to safe and environmentally responsible products Responsive to customers' safety and environmental concerns Being supplier of choice Green purchasing goals	Packaging Energy efficiency of product Water efficiency of product Toxic chemical usage No loss in quality	Advertising Product literature/labels Sales calls Customer newsletter 1-800 info line Letters to major suppliers Surveys Internet
Government	Compliance with laws and regulations Environmental degradation Health and safety	Responsible organization Proactive Moving beyond compliance	Waste reduction Pollution prevention Water quality Air emissions Emergency response Spills	Statutory returns (public domain) Statutory returns (confidential) One-on-one interaction Formal comments Trade association efforts
Community	Pollution (health effects) Knowledge/understanding of organization activities Land use ("not in my backyard" (NIMBY) principle)	Pollution reduction efforts Responsible waste management Responsive/concerned neighbour Honesty transparency	Waste reduction Pollution prevention Water quality Air emissions Emergency response	Corporate environmental report Annual report One-on-one dialogue Plant tours Spokesters Visitor centre Focus groups Community Advisory Panel Internet Advertising
Industry Association	Compliance with code of conduct Benchmarking survey	Committed to industry best practices and standards	Waste reduction Pollution prevention Water quality Air emissions Emergency response Environmental management Life Cycle Management	Annual report Corporate environmental report Reports to association Internet

Source: Adapted from Canadian Institute of Chartered Accountants, Reporting on Environmental Performance, 1994.

Ensure that the CEO delivers the message directly to demonstrate company commitment.

Tips for developing a successful communications strategy

Be honest

- Let interested parties know your plans and intentions, goals and commitments. Tell the good news, but also be honest with the bad. Being honest keeps you credible. If the results are not as good as expected, report on how you plan to address the issue.

Target information

- Target information to specific stakeholders: the confidential nature of some indicators will limit which audiences will see them.

Target reporting

- Determine the frequency of reporting (e.g., weekly, monthly, annually, etc.). Each audience will need to see the EPI relative to their concerns and their ability to manage the results. For example, it may be useful to provide quarterly EPI reports to plant managers along with the safety report and financial results, to keep environmental issues up front.

Deliver consistent messages

- Ensure that the CEO delivers the message directly to demonstrate company commitment. Ensure that the messages are consistent.

Tailor communication methods to audience

- Determine the format for explaining and presenting the EPI (e.g., internal report, presentation to senior management and board of directors, external corporate environmental report, etc.). Use different communication methods for different audiences.

Seek feedback

- Ask for feedback from internal and external stakeholders. Assess their response to your performance and the information received. Do you need to change the targets, indicators or communication methods?

Part B

EPIs used

by Various

Companies:

Examples

Overview

- Energy Consumption/Efficiency
- Water Quality and Consumption
- Waste Management
- Packaging
- Air Emissions
- Environmental Management Systems
- Office Environment
- Stakeholder Interaction
- Health & Safety

Energy Consumption/Efficiency

Conserving and recovering energy provide financial benefits. When less energy is used there are fewer air emissions and the associated environmental impacts are reduced. Both are significant reasons to measure and report energy consumption/efficiency.

Indicators to consider

- Total energy consumed/year.
- Total energy consumed/unit of production or input/year.
- Tonnes of carbon emissions/year or unit of production.

Case Study

Westcoast Energy installed an integrated energy management system at Union's Windsor Division in 1994 to monitor and control the building's heating, ventilation, air conditioning, lighting and card access systems. As a result, energy savings of approximately 400,000 kilowatt-hours were realized annually at a cost savings of \$15,000. This also resulted in a reduction in nitrogen oxide, carbon dioxide, and other air emissions.

Sustainable Development: Guide and Progress Report (1995)

Case Study

Falconbridge in Sudbury, Ontario has reduced its overall energy consumption at its Canadian operations by 6.5% and increased its overall energy efficiency by 15.5% between 1990 and 1995. In 1995, Falconbridge's energy reduction efforts were recognized with an Industrial Energy Innovator Award from the federal government.

Report on the Environment, (1996)

Case Study

General Motors of Canada Ltd., Oshawa, Ontario, converted the lighting system at the National Parts Distribution centre in Woodstock, Ontario from fluorescent to high pressure sodium (HPS) lighting. This conversion, which included both the warehouse and parking lot, resulted in dramatic improvement in lighting levels. Not only did this change of lighting contribute to both quality and efficiency improvement in the workplace but it improved outdoor security. Annual savings exceeded \$500,000. More importantly, 10.5 million kW-hours of energy were saved and 5.4 million kg of CO₂ emissions were avoided.

Environmental, Health & Safety Report, (1996)

Water Quality and Consumption

In regards to water two issues are paramount: water quality and water consumption. Water quality generally refers to the ability of a body of water to support life which can be impacted by chemical and other releases to the water and changes in temperature. Water consumption is the net amount of water that is used and not returned to the body of water from which it was drawn.

Indicators to consider

- Total releases into water/year.
- Total releases into water/unit of production or input/year.
- Chemical, physical parameters (e.g., biological oxygen demand).
- Total net water used (i.e., not returned to source)/year.
- Total net water used/unit of production or input/year.

Case Study

Falconbridge's Sudbury Moose Lake Treatment system, a \$6 million state-of-the-art system, is 100% nontoxic and discharges 99% less metal than it did only 15 years ago.

Report on the Environment, (1996).

Case Study

Noranda Forest Inc., completed a three-year, \$10-million programme to rebuild and expand production capacity at the hardwood plywood mill in Cochrane, Ontario in 1996. The programme resulted in a reduction in water consumption of 5,000 cubic metres a month, a 4.5% increase in fibre recovery and energy savings of over 3%.

Sustainable Development Report, (1996)

Case Study

In 1994, **Suncor Energy's Oil Sands Group** conserved 2000 cubic metres per day of water by recycling wastewater from the powerhouse into the extraction unit. In addition to reducing water use, the initiative also yielded energy savings which resulted in financial savings and fewer air emissions.

Suncor Environmental Report, (1996)

If waste can be turned into a resource, then the waste can generate income for the company.

Waste Management

The focus on waste management can lead to significant benefits. If means to reduce waste are found, waste disposal expenses can be reduced. If the waste can be turned into a resource, then the waste can generate income for the company.

Indicators to consider

- Total non-hazardous waste produced/year.
- Total non-hazardous waste produced/unit of production or input/year.
- Total hazardous waste produced/year.
- Total hazardous waste produced/unit of production or input/year.

Case Study

In just five years after measuring and addressing its hazardous waste production, **Sunoco** has reduced its shipments of hazardous waste by an impressive 85%. As a result of waste reduction and recycling efforts, only 376 tonnes per year now leave the Sarnia refinery. A Waste Reduction Action Plan, developed by the refinery in 1994, is expected to further reduce shipments to landfill sites.

Suncor Environmental Report, (1996)

Case Study

General Motors of Canada's Oshawa Autoplex Waste Water Treatment plant utilizes a highly innovative, new control system interface. Maximizing the efficient use of these technologies has decreased chemicals that are used in the treatment of contaminated wastewater by 50,400 kg/month. This also reflects a greater than 500 ton/year reduction in sludge produced while achieving effluent concentrations for phosphorous and metals at less than 75% of the regulatory limit.

Environmental, Health & Safety Report, (1996)

Case Study

Ontario Hydro's Lambton facility installed a scrubber system which was fully operational in 1995. The system removes the gypsum from the air emissions and Ontario Hydro sells that gypsum (175,000 tonnes in 1995) to Westroc Industries for the manufacture of drywall.

Sustainable Development Report, (1995)

The reduction in the use of packaging can lead to reduced costs from reduced resource consumption and transportation efficiencies.

Packaging

Some industry sectors (e.g., food and beverage and consumer products) are particularly concerned with the reduction of packaging. The issue is being driven by consumer concerns and legislation. (The National Packaging Protocol established a goal of 50% reduction in packaging by the year 2000.) The reduction in the use of packaging can lead to reduced costs from reduced resource consumption and transportation efficiencies.

Indicators to consider

- Tonnes of packaging/year by type (glass, corrugated, aluminum, steel, recyclable and non-recyclable plastics).
- Volume/weight of packaging materials used per volume/weight of product.
- Percentage of secondary materials used in product packaging.
- Demonstrated involvement in waste reduction and recycling initiatives.

Case Study

Environmental issues are highly integrated within **Proctor & Gamble**, particularly as it relates to packaging. P&G packaging reduction initiatives have conserved resources and reduced costs. Examples include

- Compact laundry detergents — now an industry standard in many countries, although not as well accepted by consumers in Canada, saving both materials and money
- Concentrated formulas of hand dishwashing liquids, which has saved 5.5 million pounds of plastic each year, and 4.1 million pounds of fibre no longer needed for corrugated shipping containers
- A shift to cartonless products for products such as Noxzema Original Skin Cream.

P&G Environmental Progress Update, (1996)

Companies often realize significant overall air emission reductions due to small projects at various facilities.

Air Emissions

Air emissions include all gases, organic vapours and particulate matter that are released into the air. A special concern is placed on gases and particulates which have health impacts (e.g., sulphur dioxide, mercury), greenhouse effects (e.g., carbon dioxide), and ozone effects (e.g., chlorofluorocarbons). Companies often realize significant overall air emission reductions due to small projects at various facilities.

Indicators to consider

These EPIs can apply to all emissions, emissions by category (e.g., greenhouse gas emissions) or specific emissions (e.g., carbon dioxide).

- Total emissions emitted/year.
- Total emissions emitted/unit production/year.
- Number of legislated air emissions exceedances.

Case Study

In 1995, employees at **Dow Canada's** Hydrocarbons Storage and Distribution facility reduced fugitive emissions by 19 percent or 7 tonnes. Since 1989, as a result of improved leak monitoring methods and repair programmes on over 2,000 valves, fugitive hydrocarbon emissions have been reduced by approximately 200 tonnes.

Annual Environmental Progress Report, (1996)

Case Study

Falconbridge's Sudbury, Ontario operation was able to reduce SO₂ emissions from 380 kilotonnes/year in 1968 to 54 kilotonnes/year in 1994. In 1995, the Kidd Creek operations were able to reduce the exceedance of ground level SO₂ levels by 54% over 1994 levels.

Report on the Environment, (1996)

Environmental Management Systems: Compliance and Expenditures

Developing EPIs for facilities and operations is much easier than for an Environmental Management System (EMS) due to their inherent quantitative nature. However, there are three EPIs that give some indication of the presence of an EMS.

- The system is described and/or an indication of adherence/certification against the ISO 14001 standard or other standard is provided.
- Description of a company's compliance is given. Many companies report their compliance in terms of percent compliance (total number of exceedances/total number of measurements) and total number of contraventions. Some companies report their non-compliance or compliance by issue/media (e.g., Shell Canada - air permit contraventions, Noranda Forest — air emissions and water discharges). Others report their overall compliance or non-compliance (e.g., Phillips Petroleum). An indication of compliance is also given through evidence of total fines incurred every year.
- Environmental expenditures are reported as a total for many companies and are often subdivided into capital and non-capital expenditures. There is a widely recognized inherent weakness in using environmental expenditures as an indication of environmental performance. Spending more does not necessarily equate to good environmental performance and vice versa. However, it is still somewhat valid when considered along with other EPIs.

Indicators to consider

- Presence of an Environmental Management System along with a description.
- Percentage compliance or non-compliance by jurisdiction (e.g., by province).
- Percentage compliance or non-compliance by jurisdiction and regulations (e.g., air, water).
- Total number of contraventions (e.g., air, water).
- Total number of charges for environmental offenses/cleanup orders.
- Total fines/year.
- Total environmental expenditures/year.
- Environmental Liability.

A company's environmental liability is a provision a company must make for future clean-up, decommissioning, or restoration costs. These costs can include

- Removal of plant facilities and the return of the land to an agreed upon condition
- Removal of leaking underground storage tanks and the cleanup of the site to an agreed upon condition
- Reforestation of land harvested to an agreed upon condition
- Closure of an open-pit mine and the return of the land to an agreed upon condition
- Cleanup of well and drilling sites to an agreed upon condition.

Employees within different work environments are more likely to develop innovative solutions to issues that they can influence within their own work spaces

Indicators to consider

- Total environmental liabilities.
- Total number of underground storage tanks upgraded relative to total number installed.
- Total number of acres successfully reforested relative to total number of harvested acres.
- Total number of well sites cleaned up relative to total number outstanding.

Case Study

Falconbridge reported total liability for future site restoration, in relation to their worldwide operations, as \$150 million as of December 31, 1996. These liabilities will be incurred primarily after the cessation of operations.

Report on the Environment, (1996)

Office Environment

Some companies have chosen to separate their office building's environmental performance from their operational (i.e., facilities) environmental performance. The rationale given is that employees within different work environments are more likely to develop innovative solutions to issues that they can influence within their own work spaces. Office environment issues measured and reported generally include electricity consumption, water consumption, paper consumption, paper recycling, and employee transportation.

Indicators to consider

- Total energy consumed/year & total energy consumed/employee/year.
- Total water consumed/year & total water consumed/employee/year.
- Total paper consumed/year & total paper consumed/employee/year.
- Total kilometres traveled to and from work/employee/year by mode of transportation.

Case Study

Amoco Canada measures power consumption for its facilities and its corporate headquarters separately. Between 1991 and 1995 their total power consumption at corporate headquarters was reduced by approximately 10 percent. In addition, between 1993 and 1995, the electrical usage per employee at Amoco Centre improved by approximately 20 percent. As a result of various initiatives, Amoco Centre is one of the most energy-efficient buildings in Calgary with the lowest energy operating costs in a survey of 30 comparable buildings. Amoco received a Power Smart rebate from the City of Calgary and TransAlta Utilities.

Environmental and Safety Report, (1995)

Stakeholder Interaction

The issue of stakeholder interaction is the least quantifiable of all of the previous issues. At the heart of the issue lies the question: How do the stakeholders feel about my environmental performance?

A few companies have attempted to answer this question through the use of opinion polls, tabulation of complaints, and feedback surveys from community workshops and presentations. For example, **British Petroleum** uses an opinion poll to gauge whether the public's perception agrees with the results communicated by the company. **ICI**, a British-based chemical company, monitors the number of public complaints it receives and to what they refer (e.g., noise, odour).

Indicators to consider

- Public (or another stakeholder) opinion poll results.
- Number of complaints received by issue and facility.
- Tabulation of feedback received from workshops and presentations via feedback cards.

Health and Safety

Health and safety statistics, while not directly linked to EPIs, are often reported by companies along with their environmental performance results. The most common safety performance indicator used is the lost-time injury frequency. Many companies provide industry and company comparisons to illustrate their comparative performance.

Indicators to consider

- Lost-time injury frequency per 200,000 man-hours.
- Total recordable injury or case frequency.
- Number of worker's compensation claims/year.

Case Study

Shell Canada reports its safety performance as a LTIF (lost-time injury frequency) per 200,000 work hours. It reports the LTIF for Shell employees and contractors and compares these frequencies against the Alberta oil & gas and petrochemical industry averages.

Sustainable Development Report, (1995)

EPIs are an indication that the corporate policies, objectives and targets a company sets have been operationalized.

Relationship of EPIs to Environmental Management System Policies, Objectives and Targets

Figure 2 (See next page) illustrates how EPIs are integrated into an Environmental Management System (EMS) which in turn must be integrated into the company’s overall management system. Key areas illustrated by Figure 2 include

- Identifying key stakeholders and their concerns
- Developing a company vision
- Identifying the level of environmental commitment and writing a policy and set of principles which reflects the commitment
- Carrying out an effects analysis of business activities relative to the company vision, policy and principles to identify key corporate environmental issues
- Developing a set of objectives which correspond to the principles and issues
- Developing a set of measurable targets which are based on the objectives
- Selecting a set of EPIs which will measure and report on performance relative to the objectives and targets established
- Reporting the results measured by the EPI corresponding with the objectives and targets and soliciting feedback on the entire process.

To summarize, EPIs are a tool used by many companies to measure and report on their environmental performance to their various key stakeholders. Importantly, they are an indication that the corporate policies, objectives and targets a company sets have been operationalized. EPIs are the last line in a hierarchical linkage from policy to objective to target.

Definitions of policy, objective and target are based on the ISO 14001 standard.

Policy: “statement by the organization of its intention and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.”

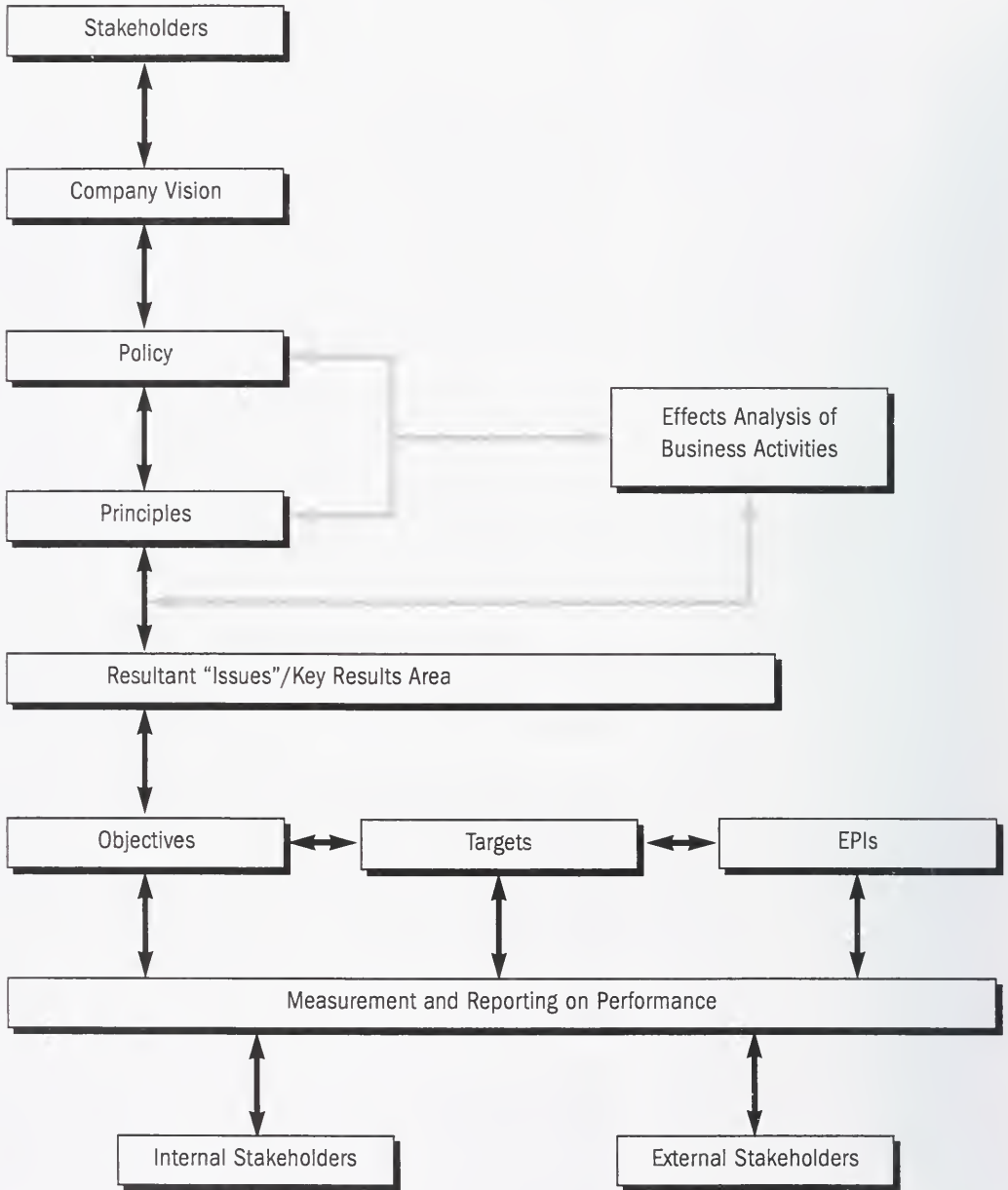
Objectives: “overall environmental goals, arising from the environmental policy and significant aspects, that an organization sets itself to achieve, and which are quantified wherever practicable.”

Targets: “detailed performance requirements, quantified wherever practicable, applicable to the organization or parts thereof, that arise from the environmental objectives and that need to be set and met in order to achieve those objectives.”

The EPIs are integrated when the targets are assigned a means of measurement. The table below illustrates the linkages between objectives, targets and EPIs.

Objective	Target	EPI
Reduce Air Emissions	25% reduction in NO _x by 2000 with a base year of 1992	Kg NO _x /tonnes of steel produced
Reduce Hazardous Waste Generation	15% reduction in annual use of chlorinated solvents by 2000 with a base year of 1991	Litres/yr chlorinated solvents generated per year

FIGURE 2:
Relationship Diagram: Policy, Objectives, Targets, EPIs, and Reporting



Summary of Best Practices: Europe, USA, Canada

Global Trends

The success of international agreements such as Agenda 21 and the Climate Change Convention depends on increased reporting both by industry and by governments. Chapter 30 of the Agenda 21 action programme, concludes that companies should be encouraged to:

- Report annually on their environmental records, as well as on their use of energy and natural resources; and
- Adopt and report on the implementation of codes of conduct promoting best environmental practice, such as the International Chamber of Commerce's Business Charter for Sustainable Development and the chemical industry's Responsible Care® initiative.

The trends in environmental measuring and reporting are led by large multi-nationals, and those companies in the energy sectors (e.g., chemicals, oil and gas, pulp and paper, auto production, airlines). With few exceptions, the main initiatives have come from Europe and North America. The following section describes global trends in measuring and reporting environmental performance.

Recommended Reporting Guidelines

Various collective initiatives promote the use of specific reporting guidelines, usually reflecting guiding principles for sustainable development. Initiatives include

Public Environmental Reporting Initiative (PERI) – In May 1993 nine leading North American corporations, including Northern Telecom, joined forces to launch PERI. PERI has the dual purpose of developing a comprehensive and credible framework for environmental reporting, and of encouraging environmental reporting itself. PERI has published a set of draft reporting guidelines, providing a useful summary of state-of-the-art reporting practice in the USA. (See page 47)

Coalition for Environmentally Responsible Economies (CERES) – Launched after the Exxon Valdez tanker disaster in 1989, the CERES Principles have now been signed by more than 50 companies. Companies commit themselves to completing and making public their own version of the CERES Report, the most comprehensive set of reporting requirements currently in operation.

Reporting Inputs as well as Outputs: Measuring Eco-Efficiency

A number of companies (EB Eddy, Danish Steel) and organizations (NRTEE, CERES) are developing EPIs that focus on resource efficiency (e.g., steel plates produced per tonne of iron ore input). Measuring inputs of production such as energy, water and resources will be essential to gauge eco-efficiency. Focusing on measures that improve resource utilization may also improve financial profitability while reducing environmental impacts. However, whether that information is reported publicly will depend on the confidential nature of the information.



Notes

For a copy of the CERES Principles or information contact Judy Kuszewski, Coalition for Environmentally Responsible Economies (CERES), 711 Atlantic Ave., 5th Floor, Boston, MA, 02111. Telephone: (617) 451-0927, Fax: (617) 482-2028.

Eco-efficiency: A Definition

The term 'eco-efficiency' was first coined in 1992 by the Business Council for Sustainable Development in its landmark report, *Changing Course*. The report suggested that eco-efficiency could be 'reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the earth's estimated carrying capacity.'

The WBCSD identified seven success factors for eco-efficiency

- Reduce the material intensity of goods and services
- Reduce the energy intensity of goods and services
- Reduce toxic dispersion
- Enhance material recyclability
- Maximize sustainable use of renewable resources
- Reduce material durability
- Increase the service intensity of goods and services.



Notes

Next Generation of Indicators

Environmental vice presidents from several leading Canadian companies have indicated a need and desire to develop a new generation of indicators that could measure environmental performance in the softer areas. Desirable indicators would measure

- Employee awareness of environmental issues
- Partnerships with environmental groups
- Communications
- Public opinion.

The NRTEE is assessing the value and feasibility of developing several indicators that may be used by companies to benchmark performance within their sector and with other companies.

Normalization

Companies are developing methods to adjust their figures to reflect changes in company output. For example, a steel company may develop an indicator that measures impact per tonne of steel produced. While normalizing is relatively easy for producers of one or two products, (e.g., steel, electricity), it is a considerable challenge for manufacturers with complex and changing products (e.g., cars, chemicals).

Case Study

Dofasco produces an annual corporate environmental report which includes normalized information relating to its energy efficiency, air and water emissions and solid waste disposal. With the exception of energy efficiency, which is reported in gigajoules per tonne of steel shipped, all performance information is provided on the basis of loading per tonne of steel shipped.

Government Legislation and Voluntary Agreements

The US Environmental Protection Agency and several states are developing programmes to recognize a company's voluntary certification to the recently approved voluntary ISO 14001 standard. As well, Nova Scotia now has a tax credit to encourage and assist companies in obtaining ISO 14001 certification. This recognition of certification is expected to result in less "command and control" intervention by regulators, leaving industries more freedom to properly manage their own environmental affairs.

Benchmarking

As the development and use of EPIs is relatively new, standardized EPIs have not for the most part, been developed. A recent National Round Table on the Environment and the Economy (NRTEE) report found numerous challenges in benchmarking. Indicators that have been developed by different companies are not necessarily simple or transparent. Compiling, synthesizing and condensing a large amount of information into one or even several meaningful measures is often extremely difficult and "the effects of subjectivity, judgment and bias in a weighting scheme, uncertainty in measurement, and differences in the products and operations of companies are compounded when such information is aggregated, indexed or normalized, and ultimately may render accurate comparison less meaningful." (NRTEE)

Despite these challenges, the NRTEE is assessing the value and feasibility of developing several indicators that may be used by companies to benchmark performance within their sector and with other companies. These indicators will focus on eco-efficiency, measuring how efficiently materials and energy are used in the manufacturing of a product.

Eventually a few specific measures that everyone will use are expected to evolve. The biggest push for standard measurements is expected to come from government, the public, and financial groups who will want to see companies benchmark performance.

In discussions with Ontario companies, most managers indicated a strong interest in being able to benchmark environmental performance. Most are willing to submit information to their industry association to facilitate the process.

Case Study

The Automobile Parts Manufacturing Association (APMA) has conducted a benchmarking study on environmental performance. The APMA did not compare specific performance, but rather asked general questions on the type of actions and initiatives a company has taken in the past few years (e.g., implementing an EMS, taking energy efficiency measures and improving water treatment systems). The study will help members benchmark their performance so they will know where they should focus their environmental efforts.

Case Study

The California Energy Extension Service commissioned a comparative benchmarking programme with five San Francisco Bay Area commercial bakeries. As part of the analysis, resource use was mapped for each company in five key categories: electricity, natural gas, water, wastewater, solid waste and recycling. Each flow was presented as a ratio to production; each company received all their own charts—and a “blind” comparison of their performance in relation to their peers.

Bakeries saw where they excelled and where other companies had done better. As a result of the benchmarking, companies shared ideas with each other on how to reduce waste and improve efficiency. Environmental performance generally improved.

(Gil Friend and Associates)

Europe

The leading trends in environmental performance measurement are coming from Europe because of stakeholder pressure for accountability, as well as government policy and direction. For example, the Netherlands and Denmark are regulating greater accountability in reporting and the Dutch government requires approximately 400 companies to submit annual environmental reports as part of their licensing agreements needed to stay in business.

Another strong driver is the Eco-Management and Audit Scheme (EMAS), the European Community environmental management system standard. Unlike other standards such as the BSI 7750 and ISO 14001, EMAS explicitly requires companies to issue regular public reports on their environmental performance. The environmental statement must include a summary of the figures on pollutant emissions, waste generation, consumption of raw materials, energy and water, noise and other significant environmental aspects. Stakeholders are pressuring companies to register with EMAS, with the result that well over 300 companies are now registered.

United States

American companies are slightly ahead of Canadian companies in developing and reporting compliance-related indicators. In part this is due to US statutory requirements for reporting under the Toxic Release Inventory (TRI) backed by stiff fines for non-compliance. As TRI-related reporting has evolved, a diverse group of regulators, financial analysts, environmental organization representatives and researchers have found novel ways to interpret and apply the information and create measures and indicators to allow comparison between companies. Another very important driver in reporting environmental performance has been requirements of the "Superfund." It has driven the requirements for the reporting of any potential environmental liabilities within a company's Annual Financial Statement.

Compared to Canada, more industry associations in the United States are involved in developing indicators due to different mandates. For example, the American Petroleum Institute requires all members to report key environmental performance measures (e.g., chemical releases, oil spills, and job-related injuries and illnesses). However, they do not publish individual results, for competitive reasons, but instead aggregate the data to report industry performance.

Case Study

EPIs can generate competitive pressure in an entirely new direction. **Santa Clara (County) Manufacturers Group (SCMG)**, a 100+ member Silicon Valley organization, compiles and publishes a consolidated TRI for its 100+ member companies, enabling both companies and community to see comparative company rankings on different pollutants — and creating powerful public pressure on the companies to clean up, and do it quickly. One company was so chagrined by its position on the list that it launched a major cleanup effort, cut reportable emissions 50%...and discovered that it was in a worse position on the list the following year, because other companies had cleaned up even faster!

Gil Friend and Associates

Canada

Across Canada, corporations wishing to report on their environmental performance are developing EPIs and documenting the results in corporate environmental reports. The sectors leading in this area are the chemical manufacturers followed by the energy and pulp and paper industries. Most Canadian industry associations have not yet fully addressed the issue of indicators, because developing environmental management tools is not central to their mandate. Among the exceptions are the Canadian Chemical Producers' Association, Canadian Electrical Association, Canadian Association of Petroleum Producers, and the Canadian Petroleum Products Institute.

Outside of company and industry associations, other initiatives include

- The Canadian Institute of Chartered Accountants has proposed a format for corporate environmental reports that includes a section on performance analysis, recommending that companies present key performance indicators and measurements, an analysis of environmental impacts and effects, and activities being undertaken by the organization.
- Environment Canada has developed the National Pollutant Release Inventory (NPRI) that requires tracking and reporting emissions and pollutant releases for industries of a designated size and type.
- The National Round Table on the Environment and Economy has started to consult and discuss the development of a core set of eco-efficiency performance indicators to allow comparison of eco-efficiency performance between companies of all types and sizes (as well as within sectors).
- The International Institute for Sustainable Development (IISD) has a Measurement and Indicators Programme. Its field work includes a pilot study on reporting progress toward sustainable development in the Prairie Ecozone of Manitoba and a collaborative effort to define a process and indicators in Guadalajara, Mexico. The programme initiated an international process that produced practical guidelines for assessing sustainable development performance, the Bellagio Principles for Assessment. The Program's Compendium, an Internet tool, (IISD website) provides information and literature on sustainable development measurement initiatives world wide.



Notes

National Pollutant Release Inventory (NPRI)

NPRI is a regulation under the Canadian Environmental Protection Act (February 1994). It requires companies in Canada to report on emissions of 178 substances. By 1996, 1,713 companies had reported. NPRI is similar to the United States' Toxic Release Inventory (TRI). There is a push by some industry groups for NPRI to add the other substances from the 117 contaminants list reported on the ARET (Accelerated Reduction/Elimination of Toxics) list.

Although many companies are trying to improve their environmental performance, not many have developed performance indicators, particularly among SMEs.

Trends with Ontario Business

A sample survey of Ontario companies was conducted prior to development of this guide to better understand the interests and actions being taken to measure and report environmental performance. The survey found that although many companies are trying to improve their environmental performance, not many have developed performance indicators, particularly among SMEs. Of those companies that do use EPIs, the process of development has been ad hoc and many companies were unwilling to share their results.

- The most commonly reported target was waste reduction. This was followed by targets to reduce energy use; improve the quality of water discharged; reduce amount of water consumed; reduce air emissions and ensure compliance. The most prevalent driver cited for these targets was the anticipated cost-savings.
- While many companies were aiming for improvement in environmental performance, they often did not set specific measurable targets. For example, many wanted to reduce waste, but did not specify any exact amounts or target percentages.
- Although most surveyed companies in Ontario did not issue environmental reports, they do report aspects of environmental performance internally to senior management, employees and boards of directors. Companies may often have to report performance in specific areas to regulators to comply with legislation (e.g., National Pollutant Release Inventory) and or voluntary agreements (e.g., Voluntary Challenge and Registry, ARET) and some reported that they provide information to insurance companies and banks. (Banks want to see Phase I and Phase II environmental site assessments.)
- Many European or American-owned branch plants in Ontario are ahead of Canadian-owned companies in measuring and reporting environmental performance as the demands from customers, regulators and other stakeholders are stronger in the USA and Europe. Often their systems have been transferred to Ontario.
- Industries that produced reports are perceived by the public as having the greatest environmental impact. These companies realized the need to address public concerns through demonstrating that they are well-managed (e.g., chemical, forestry, energy/petroleum, mining). This perception is reinforced in industry, where one manager felt that issuing an environmental report would bring unwanted attention to their environmental performance.



Notes

The data on carbon dioxide includes both estimated emission levels and forecast levels to the year 2000 for individual Canadian operations, pulp and paper, panelboard, lumber and total amount.

Noranda Forest's Effective Use of EPIs

The Noranda Forest 1996 Sustainable Development Report section entitled "Performance at a Glance" provides a clear and concise use of EPIs. The data is typically for the last five years.

Compliance

- Air Emission Regulations (% in compliance)
- Effluent Regulations (% in compliance).

Water Discharges

Pulp and Paper Mills

- BOD discharges (kg/tonne)
- Suspended solids discharges (kg/tonne)
- AOX discharges (kg/tonne).

Noranda Forest

- Chlorine gas used for bleaching (tonnes/yr).

It is important to note that in the text of the report the following statement was present — "Dioxin was not detected in any of our pulp and paper effluents in 1996."

Air Emissions

Pulp and Paper Mills

- Sulphur dioxide emissions (kg/tonne)
- Total suspended particulate emissions (kg/tonne).

Kraft Pulp Mills

- Total reduced sulphur emissions (kg/tonne). Panel Board Mills
- Volatile organic compound emissions (kg/1000 sq. ft, 1/16" basis)
Formaldehyde emissions (same units)
- Total suspended particulate emissions (same units).

All operations

- Carbon dioxide emissions (hundreds of thousands of tonnes).

Toxics (under ARET program)

Data includes chemical, base year, current year data, target date and percent reduction. Chemicals covered depend upon the facility, but include the following: formaldehyde, 2-4, dichlorophenol, 2,4,6-trichlorophenol, 2,3,4,6-tetrachlorophenol, chloroform, phenol, and chlorine dioxide.

Release Inventory

Data on releases as per the Canadian (NPRI) and United States (TRI) regulatory requirements are published and include amount released (tonnes) into air, water and soil for each facility covered by the requirements. The data covers 1994 and 1995 for Canadian operations, i.e., NPRI reports, and for 1995 US operations (TRI report). Data for 1996 was not available at the time of publication.

Recycling

- Total recycled fibre use (thousands of tonnes).

The total recycled figure used includes fibre for both paper and board products.

Forest Land Management Data

Total area harvested, clear-cut selective cut, replanted, natural regeneration, not-sufficiently re-stocked (thousand hectares)

Seedlings planted (millions of seedlings).

Environmental Audits

- Number of environmental audits for the last five years.

The report indicates that environmental audits are performed at all pulp and paper mills every two years and at panelboard and lumber operations every three years.

Public Environmental Reporting Initiative (PERI) Guidelines

Components

Each reporting organization may decide how, when, and to what extent to present the PERI reporting components listed below. No specific order of presentation is mandatory or encouraged. The recommended content to be included is as follows:

1. Organizational Profile

Provide information about the organization that will allow the environmental data to be interpreted in context:

- Size of the organization (e.g., revenue, employees);
- Number of locations;
- Countries in which the organization operates;
- Major lines of activity; and,
- The nature of environmental impacts of the organization's operations.

Provide a contact name in the organization for information regarding environmental management.

2. Environmental Policy

Provide information on the organization's environmental policy(ies), (e.g., scope and applicability, content, goals and date of introduction or revision, if relevant).

3. Environmental Management

Summarize the level of organizational accountability for environmental policies and programmes and the environmental management structure, (e.g., corporate environmental staff and/or organizational relationships). Indicate how policies are implemented throughout the organization and comment on such items as:

- Board involvement and commitment to environmental matters;
- Accountability of other functional units of the organization;
- Environmental management systems in place (if desired, include references or registration under — or consistency with — any relevant national or international standards);
- Total Quality Management (TQM), Continuous Improvement or other organization-wide programmes that may embrace environmental performance;
- Identify and quantify the resources committed to environmental activity (e.g., management, compliance, performance, operations, auditing);
- Describe any educational/training programmes in place that keep environmental staff and management current on their professions and responsibilities; and,
- Summarize overall environmental objectives, targets and goals, covering the entire environmental management programme.

4. Environmental releases

Environmental releases are one indicator of an organization's impact on the environment. Provide information that quantifies the amount of emissions, effluents or wastes released to the environment.

Information should be based on the global activity of the organization, with detail provided for smaller geographic regions, if desired. Provide the baseline data against which the organization measures itself each year to determine its progress, and quantify, to the extent possible, the following — including historical information (e.g., last three years, where available) to illustrate trends:

- Emissions to the atmosphere, with specific reference to any:
- Chemical-based emissions (include those listed in any national reportable inventories, e.g., TRI in the US, NPRI in Canada, SEDESOL's Emissions Inventory in Mexico);
- Use and emissions of ozone-depleting substances;
- Greenhouse gas emissions, e.g., carbon dioxide, methane, nitrous oxide and halocarbons;
- Discharges to water (include those considered to be a priority for your organization);
- Hazardous waste, as defined by national legislation. Indicate the percentage of hazardous waste that was recycled, treated, incinerated, deep-well injected or otherwise handled, either on- or off-site. Comment on how hazardous waste disposal contractors (storers, transports, recyclers or handlers of waste) are monitored or investigated by the organization;

- Waste discharges to land. Include information on toxic/hazardous wastes, as well as solid waste discharges from facilities, manufacturing processes or operations;
- Objectives, targets and progress made regarding the above-listed items, including any information on other voluntary programme activity (e.g., US EPA 33/50 programme); and,
- Identify the extent to which the organization uses recommended practices or voluntary standards developed by other organizations, such as the International Chamber of Commerce, the International Standards Organizations, CMA, API, CEFIC, US EPA, Environment Canada, MITI Guidelines, etc.

5. Resource Conservation

Materials conservation

Describe the organization's commitment to the conservation and recycling of materials and the use and purchase of recycled materials. Include efforts to reduce, minimize, reuse or recycle packaging.

Energy conservation

Describe the organization's activity and approach to energy conservation: commitment made to reduce energy consumption, or to use renewable or more environmentally benign energy sources, energy efficiency programme activities, reductions achieved in energy consumption and the resulting reductions achieved in VOCs, NOx, air toxics and greenhouse gas emissions.

Water conservation

Describe the organization's efforts in reducing its use of water or in recycling of water.

Forest, land and habitat conservation

Describe the organization's activities to conserve or reduce/minimize its impact on natural resources such as forest, lands and habitats.

6. Environmental Risk Management

Describe the following:

- Environmental audit programmes and their frequency, scope, number completed over the past two years — as well as extent of coverage. Indicate whether the audits are conducted by internal or external personnel or organizations, and to whom and to which management levels the audit findings are reported. Describe follow-up efforts included in the programme to ensure improved performance;
- Remediation programmes in place or being planned, indicating type and scope of activity;
- Environmental emergency response programmes, including the nature of training at local levels, frequency and the extent of the programme. Indicate the degree and method of communications extended to local communities and other local organizations regarding mutual aid procedures and evacuation plans in case of an emergency; and,
- Workplace hazards. Indicate the approach taken to minimize health and safety risks in the organization's operations, and describe any formal policies or management practices to reduce these risks (e.g., employee and contractor safety training and supervision, statistical reporting).

7. Environmental Compliance

- Provide information regarding the organization's record of compliance with laws and regulations. Summary history for the last three years should be given. Additional detail should be provided for any significant incidents of non-compliance since the last report, including:
- Significant fines or penalties incurred (define in accordance with local situation, e.g., over \$25,000 in the U.S.) and the jurisdiction in which it was applied;
- The nature of the non-compliance issues, (e.g., reportable, uncontrolled releases, including oil and chemical spills at both manufacturing and distribution operations);
- The scope and magnitude of any environmental impact; and,
- The programmes implemented to correct or alleviate the situation.

8. Product Stewardship

This component defines "product" as the outcome of the organization's activity and is applicable whether an organization manufactures, provides services, advocates, governs, etc. In addition, the section is intended to focus on both the organization's activities in producing its products or services not addressed elsewhere in the guidelines and any activities associated with the "end-of-life" of products or services.

Provide information that indicates the degree to which the organization is committed to evaluating the environmental impact of its products, processes and/or services.

Describe any programme activity, procedure, methodology or standard that may be in place to support the organization's commitment to reduce the environmental impacts of its products and services. For example:

- Discuss technical research or design: (e.g., new products, services or practices, redesign of existing products or services, practices implemented or discontinued for environmental reasons, design for recyclability or disassembly, or redesign of accounting practices);
- Provide information on waste reduction/pollution prevention programmes from the organization's products, processes or services, including conservation and reuse of materials, and the use of recycled materials;
- Describe the organization's efforts to make its products, processes and services more energy efficient;
- Describe post-consumer materials management, or end-of-life programmes, such as product take-back;
- Detail customer cooperative or partnership programmes and their development: (e.g.; used oil collection and energy efficiency services);
- Describe supplier programmes and cooperative or partnership activities designed to reduce environmental impacts or add environmental value to the design or redesign of products and services;
- Include information regarding selection criteria for environmentally responsible suppliers and standards to which they must adhere; and,
- Identify the scope of the supplier certification process (e.g., all suppliers, major suppliers or those in specific sectors).

Other components:

- Specify product stewardship targets and goals, and comment on established procedures to monitor and measure company performance; and,
- Provide any baseline data against which the organization can measure its progress.

9. Employee Recognition

Include information regarding employee recognition and reward programmes that encourage environmental excellence. Comment on other education and information programmes that motivate employees to engage in sound environmental practices.

10. Stakeholder Involvement

Describe the organization's efforts to involve other stakeholders in its environmental initiatives. Indicate any significant work undertaken with research or academic organizations, policy groups, non-governmental organizations, and/or industry associations on environmental issues — including cooperative efforts in environmentally preferable technologies.

Describe how the organization relates to the communities in which it operates, and provide a description of its activities. For example, indicate the degree to which the organization shares pertinent facility-specific environmental information with the communities in which it has facilities.

Additional Resources

- The Canadian Chamber of Commerce. 1991. *Focus 2000: A Small Business Guide to Environmental Management*. The National Round Table on the Environment and the Economy.
- Canadian Institute of Chartered Accountants in partnership with the International Institute for Sustainable Development, the Financial Executives Institute and the Canadian Standards Association. 1994. *Reporting on Environmental Performance*.
- Canadian Standards Association. 1995. *Competing Leaner, Keener and Greener: A Small Business Guide to ISO 14000*. A CSA Information Product.
- Canadian Standards Association. *Environmental Management Systems — Specifications with Guidance for Use*. A CSA Information Product.
- Deloitte Touche Tohmatsu International, Sustainability Ltd. 1993. *Coming Clean: Corporate Environmental Reporting: Opening up for Sustainable Development*. International Institute for Sustainable Development.
- Epstein, Marc J. 1996. *Measuring Corporate Environmental Performance: Best Practices for Costing and Managing an Effective Environmental Strategy*. Institute of Management Accountants, Irwin Professional Publishing.
- Ibbotson, B., and Phyper, J.D. 1996. *Environmental Management in Canada*. McGraw-Hill Ryerson.
- Tomorrow Publishing AB. *Tomorrow Magazine — Global Environment Business*. 1996-1998.

Selected Corporate Environmental Reports

- Amoco Canada Petroleum Company, *New Times: Amoco Canada's 1995 Environmental and Safety Report*
- Baxter, *Environmental Performance Report*, 1995
- Canadian Petroleum Products Institute, *Annual Report*, 1996
- Sun Company Inc., *Sun Company Health, Environment & Safety Review and CERES Report*, 1995
- Danish Steel Works Ltd., *Annual Report*, 1994
- Dofasco, *Environment Report*, 1996
- Dow Canada, *Dow Canada's 8th Annual Environmental Progress Report*, 1996
- DuPont Canada, *Environmental Performance Report*, 1995
- The E.B. Eddy Group, *A Question of Balance: Third Status Report on Sustainable Development*, 1996
- Electrolux, *Annual Report*, 1995
- Falconbridge, *Environment Report*, 1996

General Motors, *Environmental Health and Safety Report*, 1996

IBM, *Environment: A Progress Report*, 1995

Noranda Forest Inc., *Summary Environment, Health and Safety Report*, 1996

Noranda Forest Inc., *Annual Report*, 1995

Noranda Forest Inc., *Sustainable Development Report*, 1996

Nova Chemicals, *Safety, Health, Environment, Risk — Annual Performance Report*, 1995

Ontario Hydro, *Sustainable Development Report for 1995*

Proctor and Gamble, *P&G Environmental Progress Update*, 1996

Shell Canada Limited, *Sustainable Development Report*, 1995

Sunoco, *Sun Company Health, Environment & Safety Review and CERES Report*, 1995

Swiss Bank Corporation, *Our Environmental Report. Interim Results*, 1996

TransAlta Corporation, *Sustainable Development, Progress Report*, 1995

Westcoast Energy, *Sustainable Development: Guide and Progress Report*, 1995

Xerox, *Environment, Health and Safety*, 1995.

The information on specific firms that is not contained in their annual reports or other published documents was obtained from letters or conversations with the appropriate company managers. This information is filed with The Delphi Group.

Selected Websites

Nortel: <http://www.nortel.com>

Electrolux: <http://www.electrolux.se/corporate/environment/gallery.html>

IISD: <http://iisd1.iisd.ca/measure/default.htm>

British Telecom: <http://www.bt.com/corpinfo/enviro/epr/contents-nf.html>

New Bottom Line: <http://www.eco-ops.copm/eco-ops/nbl>

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- Ditz, Daryl. 1996. *Corporate Environmental Performance Indicators*. 1996 Fenner Conference.
- World Business Council for Sustainable Development. *Environmental Performance and the Bottom Line*. Draft 11 February 1997.
- ICF Kaiser International Inc. 1996. *Does Improving A Firm's Environmental Management System and Environmental Performance Result in a Higher Stock Price?*
- United Nations Environment Programme Industry and Environment. 1994. *Company Environmental Reporting: A Measure of the Progress of Business & Industry Towards Sustainable Development*. Technical Report No. 24.
- Stockholm House of Sustainable Economy. 1995. *Business and Environmental Performance: Report to the Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting before its meeting*. March 13-17, 1995.
- Storebrand and Scudder. 1996. *Storebrand and Scudder Environmental Value Fund*. Prospectus.
- Stuetz, George. 1996. *The Understanding, Selection, and Effective Use of Environmental Performance Indicators (EPIs)*. Master's Thesis, The University of Calgary.
- Schmedheiny, Stephen with the Business Council for Sustainable Development. 1992. *Changing Course*. MIT Press.
- Woodruffe, John & George Stuetz (Woodruffe Associates Inc.). 1995. *An Analysis of Leading Corporate Environmental Reports: Objectives, Targets and EPIs*. Prepared for Westcoast Energy Inc.

